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WHO'S WHERE

Changes

► **New Appointments**—Board of directors of Sabena Airlines has appointed **William Deswarte** general manager, succeeding **Tony Orts**, who becomes counsellor of the airline with the title of honorary director general manager ... **Ray A. Rugge** has been appointed chief engineer of Lear, Inc. ... Western Air Lines named **Carl J. Setter** chief cost analyst. ... **William W. Martenis** is manager of sales engineering for Minneapolis-Honeywell Regulator Co. ... Accessory Overhaul Industries, Inc., appointed **George E. Campbell** general sales manager. He was formerly with Taca Airways.

Three new appointments in General Electric Co's Aviation division: **R. A. Averitt** and **H. T. Hinkamon**, now manager and assistant manager, respectively, of the newly formed Application Engineering division, **E. S. Gallagher**, now manager of sales of the new Sales division.

Walter Macatee, formerly manager of the Airport division of the American Road Builders' Assn., is now with the Civil Aeronautics Administration as highway transportation specialist in the Office of Airport.

Lucien P. Tuckerman has joined the National Bureau of Standards as liaison engineer in the Guided Missiles Laboratory.

Charles S. Chester has become the new director of the Washington State Aeronautics Commission, replacing **Col. Joseph P. Adams**, recently resigned to resume law practice in Seattle. ... National Airlines has named **Eugene Lefferts** New York district sales manager.

► **New Board**—LANSA Airlines has elected a new board of directors: **Kail Parrish, Rafael Barvo, Julio Comelin, Jose Fernandez** and **Jose Gomez**. President of the carrier, **Hernando Padilla**, has resigned. No successor has been named.

► **Resigned**—Menasco Manufacturing Co.'s general sales manager **B. C. McNeill** has resigned. He is replaced by **J. I. Hamilton**. ... **Dale Armstrong**, formerly public relations for Foote Cone and Belding in Great Britain and Europe, where he handled Lockheed and other accounts, has resigned.

Elections and Honors

Lee Glasgow has been elected assistant treasurer of American Airlines. ... **Rufus C. Phillips, Jr.**, President of Airways Engineering Corp., has been appointed chairman of the Airport Committee of Washington, D. C., Board of Trade.

Portrait of **T. E. Braniff**, president of Braniff Airways, has been placed in Oklahoma Hall of Fame, Oklahoma City.

American Society of Mechanical Engineers cited **Donald F. Warner**, design engineer for General Electric's aircraft gas turbine divisions, and his associates, for their contributions "to the progress of the jet engine industry in its early days, by undertaking development under conditions of abnormal pressure." The citation was made by ASME's gas turbine power divisions.

INDUSTRY OBSERVER

► First successful refueling of USAF Republic F-84 jet fighters has been accomplished at the British base of Flight Refueling, Ltd., using an Avro Lancaster as the tanker. Fuel was received in Thunderjet's wingtip tanks. Flight Refueling is also conducting further refueling research with B-29s for USAF at the Tarrant, Rushton base.

► A new version of the Cierva Air Horse three-rotored British helicopter, is the twin-engined W.11T, designed to carry 32 passengers or 5 tons of cargo. One design version would use conventional Rolls-Royce engines, while another version would use gas turbines. In either case the engines are mounted outside the enlarged fuselage in nacelles, leaving fuselage space clear for cargo or passengers.

► Sikorsky Aircraft's new H-18 helicopter now in production for the USAF is an enlarged four place version of the S-52 which was landed inside the Pentagon building court at Washington a year ago. It's an indication of the general trend in the helicopter industry away from two-placers except for helicopter trainers. H-18 can be modified to carry two litters with pilot and attendant.

► The Canadian twin-jet all-weather fighter, XC-100 (now designated CF-100) is expected to be ready for its first test flights at the Toronto plant of A. V. Roe Canada Ltd., by year's end. Canadian government is spending $7 million on the development of the fighter, the largest allotment assigned to any single project, and a third of the total $21 million being expended for defense research in the fiscal year ending March 31.

► Ryan Aeronautical Co. has taken the test engine out of the prototype Super Navion and is waiting for the first production Lycoming GO-435-C2 geared engine (260 hp. at takeoff) to begin certification tests. Prototype has been flown several hundred hours, including one coast-to-coast and return trip for demonstrations and shakedown.

► Look for Aircooled Motors, Inc., at Syracuse, N. Y., to come back into more active aircraft engine competition under a reorganization plan now being developed by trustees for the Tucker Corp. which held controlling interest in the engine company. Since Tucker's financial difficulties, and the cooling off of the lightplane market, Franklin aircraft engines have not been in production except for the 6V4-178-B32 helicopter engine marketed in small quantities to Bell, Sikorsky, and United Helicopters.

► A new six-cylinder Franklin engine with around 190 takeoff horsepower is going to give Continental and Lycoming some new competition in this power class, if Aircooled Motors reorganization plans work out. The engine, Model 6AG4-185-B13, was developed a year ago but held out of production. Another Aircooled powerplant being planned is a redesign of the 500-cu.-in. displacement engine originally built to power the Republic Seabee amphibian, and now being fitted with a reduction gear, expected to result in 250 to 275 hp. with relatively slow propeller speed.

► Use of contra-rotating propeller systems in airplane powerplants goes along with growth in the use of turbine-propeller combinations. Problems of turbulence between blades which caused earlier difficulties have been at least partially solved. And there is no other logical solution to provide sufficient blade area to absorb the greatly increased turbine powers. The experimental Aeroproducts six-blade contraprop of advanced design used to test the Allison T-40 5500 hp. turbine is a sample of things to come.

► A 30-channel oscillograph is being installed in a Lockheed F-80 for the USAF at Curtiss-Wright Corp., Columbus division, to record stresses and strains in different parts of the plane's structure for the new USAF flight load test program. Similar instrumentation is planned for a Republic F-84, a North American B-45 and a Boeing B-50 following completion of the F-80 installation.

AVIATION CALENDAR

Dec. 9-10—First Convertible Aircraft Congress, sponsored by Philadelphia chapter of IAS and American Helicopter Society, in Philadelphia

Dec. 15-16—Air Transport Assn. board of directors annual meeting, Carlton Hotel, Washington, D. C.

Dec. 16-17—1949 national aviation meeting, organized by the National Aeronautical Assn., Hotel Statler, Washington, D. C.

Dec. 17—Institute of the Aeronautical Sciences 13th annual Wright Brothers lecture, U. S. Chamber of Commerce Building auditorium, Washington, D. C.

Dec. 31-Jan. 7, 1950—"Winter Wing Ding," sponsored by the Mount Plymouth Hotel and Golf Club, Mt. Plymouth, Fla.

Jan. 10-11, 1950—Florida Flying Alligator Club's Annual Rituals & Frolics, Melbourne, Fla.

Jan. 10-27—Fourth annual Air Transportation Institute conducted by American University in cooperation with CAA and ATA, Washington, D. C.

Jan. 13-15—All American Air Maneuvers, Miami.

Jan. 16-17—Miami-Havana Air Cruise for private planes, conducted by Florida Air Pilots' Assn.

Jan. 16-19—Plant Maintenance Show, sponsored by American Society of Mechanical Engineers and the Society for the Advancement of Management, Cleveland Auditorium, Cleveland.

Jan. 17—38th annual dinner of the Traffic Club of Philadelphia, Benjamin Franklin Hotel, Philadelphia.

Jan. 17-19—University of Illinois second annual Custom Spray Operators school, Urbana, Ill.

Jan. 23—IAS annual Honors Night dinner, Hotel Astor, New York, N. Y.

Jan. 23-26—IAS 18th annual meeting, technical sessions, Hotel Astor, New York, N. Y.

Jan. 24—Ninth session, ICAO Council, Montreal.

Feb. 18-26—National Sportsmen's Show, Grand Central Palace, New York, N. Y.

Feb. 27-Mar. 3—Spring meeting, American Society for Testing Materials, Hotel William Penn, Pittsburgh.

Mar. 6-9—47th annual meeting, American Road Builders' Assn., Netherlands Plaza Hotel, Cincinnati.

Mar. 28-31—National Plastics Exposition, sponsored by Society of the Plastics Industry, Navy Pier, Chicago.

Apr. 4-6—Engineering and Maintenance conference, Air Transport Assn., Hotel Continental, Kansas City.

Apr. 16-20—Annual business meeting, American Assn. of Airport Executives, Neil House Hotel, Columbus, Ohio.

Apr. 17-19—1950 aeronautic meeting, Society of Automotive Engineers, Hotel Statler, New York City.

June 10-13—National Aeronautic Assn. annual convention, Hotel Statler, St. Louis, Mo.

PICTURE CREDITS

12—Wide World; 15—Sikorsky Aircraft; 16—Howard Levy; 18—Charles Cain; 28—Douglas Aircraft Co.

NEWS DIGEST

DOMESTIC

Wright Aeronautical Corp. and two locals of the UAW-CIO have reached an agreement on terms for new labor contracts, subject to ratification by union membership. Previously, both unions had threatened to strike (AVIATION WEEK, Nov. 28). New contract will provide for company-paid hospital benefits, and union has agreed to support the company's effort to assure a normal day's work on the part of employes.

Hughes Tool Co. was exonerated of charges claiming misuse of veterans' preference in connection with purchase of five surplus planes in 1946. Federal District Court in Honolulu dismissed the case when the government admitted that neither Howard Hughes nor any other officer of the company had any knowledge of the transaction.

Gen. Carl A. Spaatz (Ret.), former USAF chief of staff, heads a board to select an Air Force Academy site. Recommendations must be in the board's hands by Dec. 31 so that the board can report to Congress in the next session. Other board members are Lt. Gen. Hubert R. Harmon and Maj. Gen. David M. Schlatter.

A CAA committee has recommended to the Budget Bureau that Andrews Air Force Base, Camp Springs, Md., be converted into a civilian air terminal as the most satisfactory method of relieving air traffic congestion at Washington National Airport.

Charles A. Lindbergh is recipient of the annual Wright Brothers Memorial Trophy, to be awarded Dec. 17, 46th anniversary of the first powered flight by the Wrights. Presentation will be made at the annual Aero Club of Washington dinner.

Civil Aeronautics Administration has approved the Dehmel Curtiss-Wright flight simulator for use in giving Pan American Airways pilots refresher and competency checks. Simulator will not entirely replace flying checks; pilots will put in 30-45 min. in the actual craft. Pan American uses the device for its fleet of Stratocruisers.

Eugene E. Wilson, chairman of the board of the National Aeronautics Assn., will be principal speaker at the opening business session of the National Aviation Forum in Washington, Dec. 16. Forum is planned as a successor to the National Aviation Clinic, held in previous years in Oklahoma City, Springfield, Ill., and Detroit.

Ninety-Nines next spring will sponsor a transcontinental air race open to all women flyers, but limited to planes with 250 hp. or less. Race will start in San Diego and finish in South Carolina. Individual race handicaps will be based on advertised cruising speed of each aircraft.

Corps of Engineers has established a Tullahoma (Tenn.) Engineering District to supervise construction of non-technical facilities at the new Air Engineering Development Center (AVIATION WEEK, Nov. 21). Temporary headquarters will be in the Office of Chief of Engineers in Washington.

Aircraft shipments during September decreased 24 percent from 3,916,900 lb. reported in August, to 2,984,100 lb., according to the Bureau of the Census. September shipments of civil aircraft amounted to 284 planes valued at $14.1 million. Military airframe weight during September amounted to 2,308,100 lb., or 77 percent. Military accounted for 98 percent of September's aircraft engine shipment of 4,721,300 hp. Engine figure was up 26 percent over August's 3,733,800 hp.

CAB has invited certificated carriers and large nonscheduled operators to apply for authority to conduct group charter operations between U. S. and Europe next summer, when Holy Year traffic will be at its peak. The Board will consider applications filed before Mar. 1, 1950, proposing such operations between June 1 and Sept. 30, 1951. A PAA charter arrangement with Felix Roma, a Catholic charitable organization, providing two roundtrips weekly to Rome during off-peak periods next year has already been approved.

FINANCIAL

Garrett Corp. and its divisions, including AiResearch Manufacturing Co., and AiResearch Aviation Service Co., has a backlog of approximately $13 million in manufacturing orders. J. C. Garrett, president, reported that all divisions were operating at a profit; board of directors has voted a 25-cent dividend payable Dec. 26 to stockholders of record Dec. 8, 1949.

FOREIGN

British Ministry of Supply approved the de Havilland Goblin 2 engine for an overhaul life of 600 hr., after exhaustive 12-month tests on the jet power plant.

Italy is spending about $1.4 million from its current counterpart fund, under agreement with ECA, for improvement of Capodichino Field, near Naples, and Ciampino Field, near Rome.

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1950 Air Force Plane Procurement

	President's Budget (48-group Air Force)	After Johnson Cut*
Grumman SA-16	30	11
Lockheed TF-80	110	80
North Amer T-28	125	85
Convair T-29	39	12
Fairchild T-31	199	0
North Amer F-86	300	250
Northrop F-89	38	27
Lockheed F-94	178	125
Convair B-36	51	47
Boeing B-47	75	75
Fairchild C-119	69	53
Boeing C-97	22	14
Douglas C-124A	54	36
Chase C-122 or Northrop C-125	25	0
Total	1335	815

*Number of planes cut from total 520 ($300,000,000). Percentage of numerical cut 36.9.

Planes USAF to Buy in 1950

Budget cuts limit procurement to 815 aircraft at cost of $1.1 billion, althongh more money may be available.

USAF has settled on a minimum aircraft procurement program for fiscal 1950 of $1.1 billion, based on the heaviest cuts ordered by Defense Secretary Louis Johnson.

This compares with $1.4 billion authorized by the President's budget and with $1.9 billion voted by Congress in October. The extra $500 million voted by Congress was impounded by the President.

Size of the firm cut demanded by Johnson below the amount set in the President's budget still remains uncertain, and a moderate amount of additional funds may be available.

First indications were that another $300 million would be sliced but later reports indicated that the cut would be closer to $200 million. The following schedule is based on the $300 million cut and the aircraft procurement budget will be increased if Johnson does not stand firm on a cut of that size.

► **Planes Shrink**—The $1.1 billion of the USAF minimum fiscal 1950 aircraft procurement program would purchase only 815 planes in contrast to 1335 under the $1.4 billion program. An additional 474 planes were earmarked for the extra $500 million voted by Congress but impounded by the President. Thus aircraft procurement program has shrunk from the 1809 maximum vored by Congress to the 815 under the minimum Johnson plan.

Largely as a result of this tremendous cut imposed by the executive branch of the government, the Office of the Secretary of Defense has been blocking all efforts to release publicly fiscal 1950 military aircraft procurement schedules. Various devices are under consideration whereby the numbers would be camouflaged under total airframe pounds and no breakdown by companies be provided as was done last year.

► **Trainer Cut**—Bulk of the Johnson-ordered cut will be felt in the trainer category where the Fairchild T-31 primary trainer has been eliminated, the North American T-28 intermediary trainer cut from 125 to 85, the Lockheed TF-80 two seater jet trainer from 110 to 80 and the Convair T-29 twin engine navigational trainer slashed from 29 to 12.

Transports come in for a heavy reduction with Douglas taking a cut from 54 to 36 C-124As; Boeing drops from 22 to 14 C-97s, Fairchild from 69 to 53 C-119s and the light assault transport category in which Chase Aircraft Corp. and Northrop Aircraft Inc. were competing is eliminated.

► **Fighter Situation**—Jet night fighters also took a cut with both the Northrop twin jet F-89 (38 to 27) and the Lockheed two-seater F-94 (178 to 125) taking slashes. USAF is concentrating on the Lockheed night fighter because of its relatively low cost and long time value as a night fighter trainer after it becomes tactically obsolescent.

North American is getting all the day fighter business with a firm allocation of 250 F-86s compared to an original schedule for 300 under the 48-group program. Although USAF is still listing the North American fighter as the F-86 it is more than likely that part of this order will eventually be switched to the North American F-93 which is a faster and radically modified version of the F-86. The F-93 features a pointed nose, flush air inlets and will be powered by a Pratt & Whitney J-48 (better than 6000 lb. thrust) turbojet just going into production at the engine firm's East Hartford, Conn., plant. The J-48 will be equipped with an afterburner.

► **Two Bombers**—Bomber procurement is concentrated on the twin choices of Strategic Air Commander Lieut. Gen. Curtis E. LeMay—the Convair B-36D, of which 47 will be bought, compared to the 51 originally scheduled, and the Boeing six-jet B-47, which remains firm at 75 planes in both programs. The B-47 is being built in Boeing's Wichita plant.

Grumman will get another order for its twin-engine amphibian rescue plane being used by both the USAF and Navy. There is some additional procurement money not being allocated which will probably be used to procure helicopters for Arctic rescue work.

CAB Okays Coast-to-Coast Coach

American and TWA begin trans-continental flights this month with DC-4s; American can use DC-6s in April.

Air coach transportation this month received its biggest boost as the Civil Aeronautics Board opened the richest domestic long-haul route to scheduled, tourist-type operations at 4½-cents-a-mile fares.

American Airlines and TWA were given permission to start New York-Chicago-Los Angeles coach flights with 70- and 60-passenger DC-4 equipment, respectively, starting Dec. 27. More importantly, CAB authorized American to replace its DC-4s with 70-passenger DC-6s in April.

AA will thus become the first carrier to use high-speed postwar equipment for tourist-type service. Some industry observers believe TWA may be forced to convert some of its Constellations into high-density ships to meet American's competition.

AA already has solicited bids for modifying three of its 52-passenger DC-6s into 70-seat air coaches; work on the ships will start in January.

Both American and TWA plan to make one transcontinental round-trip daily with coach equipment. Their $110 coast-to-coast fare compares with $88-$99 for major irregular operators, who are expected to suffer severely from the new scheduled competition (AVIATION WEEK, Nov. 7). Regular 6-cents-a-mile airline fare from New York to Los Angeles is $157.85.

▶**UAL Gets Set**—With Northwest Airlines already offering 4-cents-a-mile DC-4 coach service between New York and Seattle, United Air Lines becomes the only certificated transcontinental carrier without a cut-rate coast-to-coast operation. And even UAL last week hoisted one foot on the low-fare bandwagon by proposing a reduced rate of 5 cents a mile on one DC-4 round-trip daily over its Los Angeles-San Francisco-Portland-Seattle and Chicago-Omaha-Denver-Salt Lake City-Boise-Portland-Seattle Routes.

If CAB approves, the reduced UAL fares will become effective Jan. 16. The new United tariffs would go part way toward meeting the 4-cents-a-mile coach competition of Northwest between Chicago, Portland and Seattle, and of Western Air Lines along the Pacific coast.

▶**Policy Departures**—The latest TWA and American tariffs differ in two respects from CAB's previous policy statements on air coach announced last September.

SWEDISH JET NOW IN PRODUCTION

Sweden's Saab 29 transonic jet fighter (AVIATION WEEK, July 12, 1948) is now in quantity production, after undergoing 12 months of flight testing. The pressurized interceptor is equipped with an ejection seat of Saab's own design. Three prototypes are equipped with British-built de Havilland Ghost jet engines of 5000 lb. static thrust, production models will have engines of the same type manufactured under license in Sweden. Saab claims the craft has reached its design Mach number.

• **No limitations on departure and arrival times** were imposed. The Board indicated it had required such limits to confine coach operations to off-peak periods of the day or night. In trans-continental service, however, there appeared to be no well-defined traffic peaks.

Thus American's westbound coach flights will leave Newark at 9:30 p.m. and arrive at Los Angeles at 10:29 a.m. Eastbound coach will leave Los Angeles at 6:30 p.m. and arrive at Newark at 10:57 a.m.

• **Deadline was extended** for coach tariffs from June 30, 1950 to Dec. 31, 1950 for the new transcontinental service to give American a reasonable time to obtain experience with its high-density DC-6s. CAB indicated it would establish Dec. 31, 1950, as the deadline for other coach operations wholly or partly competitive with transcontinental tourist-type services of AA and TWA. The June 30 deadline will continue for remaining coach tariffs.

▶**DC-6 Factors**—CAB said it permitted use of DC-6s in coach service because the planes will have a sufficient number of seats to allow gross revenues at lower rates to approximate the gross revenue from regular 52-seat flights at comparable load factors.

The Board recognized there is danger that a DC-6 coach operation may divert more traffic from first-class flights than DC-4s, but it indicated the threat was outweighed by operating and cost advantages and potential service improvements to the public. If, at the end of the experimental period, it appears that DC-6 coach operations create excessive diversion, CAB will require the faster coach service to be discontinued.

Coincidentally with its action on transcontinental service, CAB extended TWA's Kansas City-Los Angeles coach tariff until Mar. 1 to permit the carrier to replace its DC-3s with larger equipment. Earlier, however, the Board suspended West Coast-Hawaii tourist fares which Pan American Airways and Northwest Airlines had hoped to institute Dec. 1.

▶**Capital Kick**—Capital Airlines had asked for suspension of both the AA and TWA transcontinental coach tariffs insofar as they applied to the New York-Chicago link, where it already operates reduced-rate service. It said use of luxury DC-6 equipment and the lack of restriction on departure time "violate fundamental principles on which CAB has established coach services."

According to Capital, AA's coach-type DC-6 service at 4½ cents a mile would be substantially more attractive than Capital's regular 6-cents-a-mile 50-passenger DC-4 operations. (Capital's New York-Chicago coach rate of $29.60 will be well under AA's $35 coach tariff.)

TWA also attacked American's DC-6 coach proposal. Board Chairman Warren Lee Pierson wrote CAB members that TWA "is opposed to introduction at this time of DC-6 Stratocruiser or Constellation equipment into the air coach field, since we believe such action would constitute an indiscriminate entry into this market, resulting in a general debasement of the existing passenger fare level."

Baker's Views

G. T. Baker, president of National Airlines, last week strongly endorsed coach operations, pointing to his airline's successful experience. In a speech before the New York Society of Security Analysts, he gave this example:

At one time, the carrier had a flight that left New York at around midnight because of schedule balancing requirements. If 12 passengers were aboard, the company considered itself lucky. Now, with little difference in service but a lot of difference in price, 40 and 50 passengers are carried. The contrast was pointed up in carrying 10 passengers at $80 a head and 30 at $50 each as an indication of successful air coach economics.

▶**Two Faults**—Baker asserted that there are two major faults with coach operations as presently regulated. These are the time and equipment restrictions. The public is inconvenienced when it is forced to fly at odd hours to save money. Neither is it logical to restrict an airline to DC-4 equipment in air coach service. More modern equipment, such as DC-6s, can be operated for considerably less per seat mile than DC-4s.

U. S. Steps Into Canada-Colonial Fight

A U. S. State Department protest note to Canada last week questioned the right of the Dominion's Air Transport Board to revoke Colonial Airlines' license to operate between New York and Montreal.

The Department said it did not believe such action was contemplated by "any provision" of the U. S.-Canadian air agreement, thereby bringing to a diplomatic level latest developments in Colonial's efforts to prevent Trans-Canada Air Lines from starting competitive service between the two points.

The Canadian agency recently ordered Colonial to show cause why the license should not be revoked. Hearing on the order was set for today.

Colonial President Sigmund Janas told AVIATION WEEK that the Canadian board's action was not unexpected. "They (the board) have been trying to intimidate me for some time and now they have come out in the open."

ASSISTANT SECNAVAIR

John F. Floberg, former wartime Navy gunnery officer, was named by President Truman as assistant Secretary of the Navy for Air, succeeding Dan A. Kimball, who was named undersecretary. Floberg, a recess appointee, took office last week.

The Canadian "show cause" order followed a decision by a special U.S. court in Washington telling CAB to suspend action on TCA's request for Montreal-New York operating rights until the Supreme Court had ruled on the legality of last June's U.S.-Canadian civil air agreement. This pact permitted Canada to designate a carrier to fly not only the Montreal-New York link but also routes through Florida to the Caribbean, and through Hawaii to Australia.

The U. S., in turn, was given traffic rights at Gander on the North Atlantic route and at Edmonton, Alberta. Colonial claimed its property rights in the New York-Montreal route were being taken away from it without due process of law by virtue of a CAB conspiracy.

Last month, the special U.S. court dismissed Colonial's suit which contested the constitutionality of the foreign air carrier permit sections of the Civil Aeronautics Act and charged that the U.S.-Canadian pact is invalid. But the court refused to lift the temporary injunction Colonial had obtained to prevent CAB from making any recommendations on the TCA case to President Truman, who must approve new foreign air carrier permits.

West Coast Visit

West Coast aviation manufacturers will have a discussion of renegotiation problems, with Frank L. Roberts chairman of the Military Renegotiation Policy and Review Board, Thursday afternoon, Dec. 8 at the State Building in Los Angeles. A talk by Roberts on "Fundamentals of Statutory Renegotiation," will be followed by a forum discussion on specific manufacturers' problems.

General industry session follows a tour of individual conferences at aircraft plants, which started last week at the Seattle Boeing plant and included Lockheed and North American Aviation.

Scheduled visits include Convair at San Diego, Dec. 5; Northrop and subcontractors at Hawthorne, Dec. 6, and Douglas and subcontractors at Santa Monica, Dec. 7 and 8.

Touring group includes Barron Gnet, counsel, MRPRB; Sumner Marcus, counsel, Navy division, and Thomas Coggeshall, Stuart Ross and Hayward L. Elliott, of Air Force division, Armed Services Renegotiation Board.

Study Made of Aircraft Labor

The master aircraft mechanic gets a wage which, over the country, averages $1.82 an hour. A janitor in the aircraft industry averages $1.12.

That is the range of average wages for 51 selected jobs in aircraft manufacturing based on a study by the Bureau of Labor Statistics covering last May and June. The survey covered 20 aircraft plants with 140,000 employes. Only one plant surveyed employed less than 500.

Most wages averaged between $1.50 and $1.70. Only janitors averaged below $1.24, which is the rate earned by Class C punch-press operators.

The greatest proportion of workers are assemblers who earn $1.52 in Class A and $1.31 in Class B.

These are average wages for all 20 plants. Some plants pay more and some pay less. The figures do not include extra pay for overtime or night work.

▶**Other Conditions**—Other results of the survey:

Workweek—All but one plant scheduled a 40-hr. week.

Second shifts—All but one plant scheduled second-shift work involving 22 percent of the plant workers.

Third shifts—Eleven plants had three-shift operations but a small proportion of the employes worked on the third shift.

Shift premium—All plants pay a premium for work on second and third shifts.

Paid holidays—All but one plant give paid holidays. The number ranged from four to eight holidays.

Paid vacations—All give a paid vacation after one year on the job.

Pension plans—Seven plants have old age retirement plans, three of which pay the entire cost.

Insurance—All plants have one or more types of insurance plans.

Constitution Use Poses Problems

CAA approval of craft for commercial operation might take a year or more—JATO use also must be cleared.

By Alexander McSurely

A Pan American World Airways bid to lease the two huge Navy Lockheed Constitution transports for 5 percent of the original Navy $27 million investment in the planes stands good chance of acceptance, Washington sources said last week.

A Navy spokesman said that if Pan Am had made such an offer it had no official status at this time since several factors would intervene before the transports would be open to lease to anybody. Presently the planes are being operated by the Navy and may continue in operation for several months. Before they are eligible for lease it must be established that the planes will not be required by the USAF and particularly Military Air Transport Service. Reports that neither MATS nor the Air Force is interested in the Constitutions have not been officially communicated to the Navy. Leasing the airplanes is seen as a final alternative before the process of deactivating the airplanes and putting them in cocoon storage at Litchfield, Ariz.

Pan Am and at least four other bidders—two airlines and two contract carriers—want the big Lockheed R-60s for high density air coach-type passenger transport. One suggested use is on Pan Am's New York-Puerto Rico run, where each plane might carry as many as 200 passengers. A one-stop transcontinental route with legs more evenly divided than the Navy's old transcontinental R-60 route (which stopped at Olathe, Kan.) is another good high density possibility, if one of the other lines gets the planes.

►**Certification Problem**—If Navy agrees to lease the planes, however, the successful bidder is up against a problem of getting them certificated for commercial operation by CAA, a problem which is serious enough to give several prospective bidders pause.

Started as a design for Pan American, designated Lockheed Model 89, the plane project was adopted by the Navy when problem of logistics in the Pacific resulted in a 1943 contract for 50 of the planes at a cost to the government of $111 million.

A VJ-Day cutback reduced this contract to two planes, and $27 million.

►**Pan Am Cancelled**—Five months before the first Constitution made its first flight in Nov. 1946, cancellation of conditional contracts for the big plane were announced by Pan Am and American Overseas Airlines. (Aviation News, June 24, 1946.)

At that time Lockheed expected the airlines to show renewed interest in a turbine-propeller powered version of the Constitution Model 189, which was then being developed. This development was later shelved.

►**6 Months Minimum**—CAA engineers estimate that certification of the big Constitution will take a minimum of six months and perhaps as much as a year, before the planes could go into commercial operation. While accurate estimates of certification costs are not available it is probable it would amount to at least as much as the certification cost for the Boeing Stratocruiser, reported at around $1 million.

In the Constitution's favor was the attempt of Pan Am and Lockheed to get the 156-ft-long transport certificated as it was built by the Navy. CAA engineers supervised much of the construction of the plane, and consider it meets structural requirements of that time rather completely. It was designed to the old CAR 80 mph. maximum landing speed requirement, but later dropped to accommodate the Boeing Stratocruiser. But the Navy did not approve a full certification program. New CAB and CAA technical requirements which have been put on the books since, including such things as new fire protection provisions, will still have to be met, and the plane will have to be flight tested under CAA requirements.

►**14,000 Hp**—The first Navy plane designed and built for its transport specification, the Constitution is powered with four Pratt & Whitney Wasp Major R-4360 engines rated at 3500 hp each.

In addition it is equipped with six JATO units installed in the wings, which will give an added takeoff boost of 6000 thrust lb. for 15 sec. and cut takeoff run 25 percent. Navy used the JATO units as standard operating procedure in its takeoffs on the transcontinental run, but whether they would be allowed yet in commercial operation is another problem the successful lessor would have to solve. No other commercial airline JATO takeoffs have been approved.

►**Biggest Operating**—Biggest transport which has been regularly operated anywhere, the Constitution has a 189 ft wingspan and its single tailfin is 50 ft. 4½ in. high. Fuselage is a figure eight design with upper and lower compartments in equal diameters.

Decision to lease the planes by the Navy came after the economy program of Defense Secretary Johnson took them out of service, but not until the Navy had piled up valuable transport operational experience in hauling personnel and cargo with them. One example of this was a flight in which two AVIATION WEEK editors participated, last spring, when the Constitution carried the largest number of persons ever carried on a transcontinental flight in one plane from Moffett Field, Calif., to Washington National Airport, with a stop at Olathe. This flight carried 118 persons.

►**At Least 200**—Upper deck in the Navy passenger version is fitted to accommodate 92 passengers, while the lower deck alternately used for cargo, can be fitted to accommodate 76 more persons. However, under a high density seating arrangement it would be a simple modification to seat at least 200 in the plane without undue discomfort to the passengers.

Main drawback of the plane from an operational standpoint is that it is underpowered in comparison with smaller and speedier competitors which carry much smaller gross weight with the same four Wasp Major powerplants on the Constitution.

►**Performance Report**—Performance data quoted for the Constitution with its present powerplants includes 260 mph. cruising speed at 25,000 ft., 78 mph. stalling speed, 303 mph. top speed, rate of climb of 700 ft./min. at normal gross, ceiling of 28,600 ft., normal range of 5390 mi. and maximum range of 6700 mi.

In the transcontinental flight previously referred to, the Constitution actually cruised at slightly over 200 mph. at about 19,000 ft. with little aid or hindrance from the winds aloft.

►**Turbo-Prop Version**—Lockheed reported at the time it was discussing a turbine-propeller powered version, that such a plane would cruise at around 350 mph. with a top speed around 400 mph.

Presumably the plane could be fitted with four of the 5500 hp. Allison T-40 gas turbines with propellers, and get somewhere near that speed with such an installation, with relatively minor change in range.

Whether a lessor would want to undertake such a major powerplant change, without getting full title to the airplane, or whether it would be profitable, even so, to make the change for only two airplanes appears doubtful, particularly when the additional certification delays which would be involved are considered.

RADICAL FEATURES in helicopter design are shown in H-19. Clamshell doors for engine accessibility, large cabin below flight deck.

Sikorsky's Double-Deck Helicopter

New H-19, entrant in USAF rescue competition, has large cargo or passenger compartment below cockpit.

Sikorsky's entry in the USAF air rescue helicopter competition, the new H-19, was disclosed last week as a box shaped utilitarian craft resembling the equally utilitarian fuselage of the Fairchild C-82 Packet, with a similar upper flight deck for the crew, and a large cargo compartment below.

With orders for five of the helicopters already received in a recent USAF procurement switch, Sikorsky expects to make its first military delivery in February. CAA certification is being pushed along with the military production work with hopes to get the new aircraft certificated as the commercial S-55, and possibly in trial operation early next summer.

►**Small Package**—Most surprising thing about the new H-19 is the smallness of the complete package in comparison to its capacity. Actually the rotor diameter is only 53 ft., 4 ft. greater than that of the H-5H Sikorsky, the length is 41 ft. 8½ in., only 2 ft. 2½ in. longer than the H-5H, and the overall height, 14 ft. 8 in. is only 2 ft. 4 in. greater.

The aircraft has a normal gross weight of approximately 7000 lb. and a military useful load of approximately 2800 lb.

The H-19's main compartment, for cargo or passengers, provides a box shaped clear space 6 ft. high, 5 ft. 6 in. wide and 10 ft. long. In this, the Sikorsky designers find room for eight litters and one attendant, or 10 passengers plus crew of two on the flight deck. As a contrast, the slightly smaller H-5H space for only three litters or three passengers.

►**Move Engine**—The larger cabin was made possible by locating the 600 hp. Pratt & Whitney R-1340 radial engine in the nose of the aircraft, instead of behind the cabin, as in previous Sikorsky models. The new location makes it possible to use clam-shell doors around the engine compartment, giving unusual accessibility to the powerplant for maintenance and powerplant change if necessary. Sikorsky representatives estimate that a complete powerplant change including fan could be made in approximately 2 hr.

Prototype which made its first real flight Nov. 21, has been logging time in tiedown tests in a 10 percent overload condition and flights for sometime to build up a total of about 70 hr.

►**Power Hoist**—Designed specifically for rescue work, the H-19 has a power hoist, which will permit it to make rescues while hovering in midair. Entrance in the main cabin or cargo compartment is through a door 4 ft. square.

As a commercial version it is believed the cabin could accommodate 12 persons. It is designed for 3 hr. range with 10 passengers, cruising at approximately 100 mph., in the 600 hp. version.

Like two other competitors in the new USAF rescue competition, Sikorsky has submitted an alternate proposal to fit an 800 hp. engine in the aircraft if desired. The H-19 has been engineered with such a change in mind, and would not need major modifications structurally to accommodate the bigger power plant.

Radar Net Funds Allotted by USAF

Immediate construction of an aircraft warning network of radar stations across Alaska and continental U. S. will be started using $50 million allotted by the USAF, at the expense of cancelling or reducing other USAF projects in this amount, in the fiscal 1950 program.

Overall expenditure of $85.5 million for construction of the network has been approved by Congress of which not more than $50 million was authorized for fiscal 1950.

$31.2 million of the first year's total will be expended on the Alaskan stations in the aircraft control and warning chain, with the remainder to be used for facilities within the U. S. Most of the sites for stations in the net have already been chosen with rights of entry, property leases and construction plans completed.

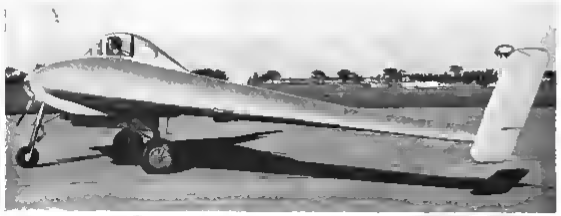
Lt. Gen. E. C. Whitehead, commanding general of Continental Air Command, Mitchel Field, N. Y., and Brig. Gen. Frank A. Armstrong, Jr., commanding general of Alaskan Air Command are in charge of the two segments of the network installation.

Existing World War II radar equipment which will be adapted to the network installation is valued at $42,250,000. Another $26 million will be needed for electronic equipment developed since the war, and $7 million is estimated as the cost of maintaining picket ships as part of the network.

The completed network, if funds are made available, will include two types of radar defense: a "two-notch" screen

with 300 mi range around certain areas, and a 150 mi range "one-notch" screen around other areas

An Air Force spokesman said that the $50 million for the network had been taken from the 1950 schedule by an "across the board" cut on virtually every other USAF project, exempting only aircraft schedules and research and development funds



ON GROUND, National Research Council glider shows off smooth construction

IN FLIGHT craft reveals sweptback outer wing panels and unique separate cockpits

Canada Testing Tailless Glider

Flight characteristics of all-wing configuration being evaluated by using heavily instrumented craft.

The Canadian government is conducting an extensive flight testing program with a tailless glider to gain more information on stability, control and general flight characteristics of tailless type aircraft

Designed and built by the National Research Council, experiments with the glider are carried out jointly by NRC and the Winter Experimental Establishment of the Royal Canadian Air Force at Edmonton, Alberta, and Arnprior, Ontario

▶**Characteristics**—With a U type planform and separate side-by-side cockpits for a pilot and engineer-observer, the craft has a 46-ft wingspan and a length of about 18 ft Maximum weight is 4150 lb, giving a wing loading of 10 lb/sq ft The glider is made entirely of wood and is said to have a remarkably smooth skin surface Skin is relatively thick molded plywood, and conventional ribs are used with a single laminated spar

Fins and rudder combination is fitted to each wing tip "Elevons"—combined elevators and ailerons—are utilized An interesting feature is the movable wing tips, rotated by means of a jack, to provide a nose up movement of the glider The craft has conventional split flaps and differential brakes It also is equipped with retractable tricycle landing gear and, in addition, has retractable skids for emergency landings

▶**Heavily Instrumented**—The glider carries several hundred pounds of instrument, batteries and related equipment It is provided with automatic recording cameras to photograph such data as time airspeed tip angle, flap angle, rate of yaw, controller hinge movements, rudder angle outside temperature, etc

The ground handling and flying characteristics of the craft are reported to be very good Taxiing is said to be easy and takeoffs have been made at speeds of 70-90 mph with ground runs ranging from 2600 to 3150 ft

A 350 ft nylon rope is used for towing by an RCAF Dakota with towing speeds ranging from 100 to 140 mph In free flight, the glider has flown at speeds ranging from 55 to 150 mph with the center of gravity at 50-55 per cent of the center section chord

Normally, the craft is carried to 6000-12,000 ft altitude and then released for free flight. When it drops to 4000 ft, all testing is discontinued to prepare the craft for landing. Approach speed is about 85 mph and normal landing speed is 60 mph Landing approach is said to be simple and straightforward and spot landings can be made with errors of less than 200 ft

Navy Cutback Hits Attack Planes

Navy recently reduced its combat air strength by 20 percent

The cut was occasioned by fiscal 1950 budget cuts and budgetary planning for fiscal 1951 which will further reduce the size of the Naval air establishment

Navy will decommission 470 out of a total strength of 2258 combat planes and eliminate four attack groups, five patrol squadrons and seven Marine fighter squadrons Navy currently has a total air strength of about 7000 planes of all types including those in storage

Meanwhile prospects looked dim for shifting elsewhere the major portion of a $203 million cut scheduled for Naval aircraft procurement's fiscal 1950 budget Defense Secretary Louis Johnson indicated that part of the cut might be allocated elsewhere in the Navy but latest reports from the Pentagon indicate that the cuts will stand as ordered by the Navy Bulk of the cut will be applied to new attack planes including the North American AJ-1, the Douglas AD series and the Grumman AF series Navy is now scheduled to operate only eight large attack carriers in fiscal 1951

Most 377s Completed

All but five 377 Stratocruisers have been completed of a 55-plane order, and employment at Seattle, Wash., plants of the Boeing Airplane Co has dropped to 20,048 from a peak of about 26,000 The "decline will continue until new orders are received," the company has announced

Last of the five Stratocruisers is scheduled to be out of the plant before Christmas, although some work still will remain to be done on the field before delivery Pan American World Airways now has 19 of its 20 planes, Northwest 9 of 10 and American Overseas 7 of 8 Forty planes have been delivered and ten are still on the field

FINANCIAL

Airline Dividends Seen Increasing

While only small lines paying on common this year, better earnings point to wider distribution in 1950.

The recent action of Mid-Continent Airlines in paying a second 25-cent per share dividend on its common stock this year points up the curious circumstance of disbursements on junior equities during 1949 being confined to a few of the smaller airlines The "Big Four" and most of the secondary grouping of domestic airlines refrained from paying any dividends on their common stock This pattern is the opposite of that prevailing in previous years and presents an interesting phenomena

Nevertheless, in view of the sharp reversal of earnings evident for 1949, and with 1950 auguring well for further rehabilitation of finances for many carriers, the resumption of dividend payments next year by an increasing number of airlines appears likely.

▶**Consistent Earnings**—A relatively small sectional carrier, Mid-Continent has shown an enviable record of earnings in recent years The company has reported a net profit consistently from 1942 without interruption While the carrier is highly dependent upon mail pay to maintain profitable operations, reliance from this source has been decreasing throughout the years

For example, during 1942, 64.2 per cent of its total revenues came from mail compensation. For 1948, this ratio was down to 17.5 percent The company paid the first dividend in its history during 1948, when 25 cents per share was disbursed During the second quarter of this year, Mid-Continent paid the same dividend The recent action, bringing total dividend payments to 50 cents per share for the year, was somewhat of a pleasant surprise to holders of the company's outstanding 390,779 shares

▶**Other Dividends**—Earlier this year, Chicago & Southern Air Lines distributed 35 cents per share to its 509,326 capital shares outstanding This carrier last paid a dividend in 1945 when 25 cents per share was disbursed. Following deficit operations of 1946 and 1947, earnings were restored during 1948 and have continued through 1949 Mail revenues have been an important factor in bolstering C&S's earnings During 1948, almost 27 percent of the company's combined domestic and international revenues came from mail compensation

Delta has demonstrated a desire to pay dividends when earnings permitted over a long range of years Starting with 1938, Delta paid a dividend every year through the end of 1947, with the exception of 1941 In an apparent desire to husband its cash, the company omitted a dividend payment for its fiscal year ended June 30, 1948 However, with a dividend disbursement of 25 cents a share made earlier this year, Delta is once again in the dividend paying column During 1948, Delta obtained 19.8 percent of its total revenues from mail compensation

In the aggregate, dividend disbursements for Mid-Continent, Chicago & Southern and Delta amount to less than $450,000 for 1949 Accordingly, for substantial distributions of dividends it will become necessary for the larger airlines to make such disbursements

▶**Eastern's Position**—In many circles, for example, it was believed that Eastern in view of its healthy financial condition and continued good earnings, might be inclined to make a "token" disbursement this year While action of this type might yet be forthcoming before the 1949 close, such prospects are beginning to fade as time elapses. In this instance a token disbursement of only 25 cents a share would amount to almost $575,000 on Eastern's capitalization, or more than the total distributed by the three smaller carriers mentioned

American Airlines with its $40 million in 3½ percent preferred stock will have paid $1.4 million in dividends on this issue during 1949, the same as for 1948 American is also likely to resume dividends on its common stock late next year if the present trend of earnings continues

▶**American Advancing** — Significant progress is expected in the overall American financial picture during 1950 Should the proposed acquisition of American Overseas by Pan American be approved by the CAB, American will receive about $10.8 million for its AOA stock This will further augment its already mounting cash position and may permit anticipating the retirement of a large block of its outstanding debentures

The credit of these debentures has been improving rather markedly during this year with new highs being recorded on successive transactions. In June, 1946, $40 million of these 3 percent debentures were sold by an underwriting syndicate headed by Kidder, Peabody & Co. at a price of 102 A low of 70 was established for this issue during 1949 with recent quotations closer to 94 It is known that more than $30 million of these debentures are held by insurance and fiduciary interests

Despite substantial losses during 1947 and 1948, American persistently maintained dividend payments on its preferred stock, establishing an unbroken record. It is logical to assume that any retirement of the company's debentures will tend to improve the position of the company's preferred shares and, to a lesser degree the common as well. There are 6,452,835 shares of common stock outstanding for American, the largest number for any company in the industry. A dividend of only 50 cents a share would represent the disbursement of some $3,226,418

▶**UAL Outlook**—United Air Lines has maintained an unbroken dividend record on its approximately 95,000 shares of 4½ percent preferred stock This disbursement amounts to about $427,500 annually and continued payments in the face of temporary deficits has done much to improve the standing of this issue at the present time As United continues to retire its outstanding debt and maintain its present trend of earnings, resumption of dividends on its common stock is possible during 1950 The company has more than 2 million shares of common stock outstanding

Northwest Airlines with its 390,000 shares of 4.6 percent preference stock issued at $25 per share in April, 1947, has managed to maintain an unbroken record of dividend payments on this senior equity With a $21 million loan, of which $12 million is guaranteed by the Reconstruction Finance Corp., resumption of dividend payments on the common stock appears unlikely for 1950 Permission of the RFC would be necessary for this action and this may not be forthcoming until a material reduction in debt is accomplished

TWA has been demonstrating a remarkable recovery in earnings during 1949 with further improvement indicated for 1950 While the company has a heavy debt structure, rapid progress is being achieved in its reduction It is known that one of President Ralph Damon's objectives is to place the company's common stock on a dividend paying basis as soon as financial and earnings conditions permit

Regularity of dividend payments on airline common stocks will represent one manifestation of the industry's losing much of its speculative character and assuming greater stability

—Selig Altschul

EXHAUST SILENCER under fuselage of Chrislea Skyjeep, British export lightplane

British Bid in Lightplane Market

New "family-size" craft powered by 155-hp. engine is priced at about $5600 and aimed at export field.

A 155-hp Chrislea Skyjeep, designed to carry four adults plus two children, or to serve as an ambulance or light cargo plane, has made its first test flights at Exeter Airport, and is being aimed by its British manufacturer at the export market in competition with American lightplanes.

Developed from the Chrislea Ace (AVIATION NEWS, May 20, 1946) the new plane is priced at "just over 2000 pounds" (about $5600) and has already been subject of inquiries reported from Australia, New Zealand and South America, where its principal markets are expected to be found.

▶**First Flight**—The Skyjeep was first shown at the recent Farnborough show of the Society of British Aircraft Constructors prior to flight late in November. It is described by the manufacturer as the civil counterpart of its military kinsman, the Chrislea Series 3 ambulance aircraft.

The plane is an example of a return to more conventional engineering by a manufacturer, after a failure of the consumer to accept some of the interesting and apparently attractive innovations designed into the original Chrislea Ace.

▶**Conventional Gear**—Most obvious of the changes is the use of a conventional tailwheel landing gear, replacing the tricycle gear used by the Ace. The new undercarriage is designed for quick installation of Goodyear cross wind swiveling wheels, but presumably crosswind gear could have been used also with the tricycle gear, if this had been desired.

Conventional dual stick and rudder controls are replacements for the wheel controls of the earlier plane. Original control of the Ace involved a three-way movement of the wheel control without rudder pedals. Ailerons were operated by turning the wheel, movement of control column to right or left actuated the rudder, and vertical movement of control column actuated elevators. Later the company added rudder pedals, after British pilots did not accept the unconventional control.

▶**Engine Change**—Single wing struts are used on the new version. From the 100-hp. engine originally planned for the Ace, the powerplants have been increased to the present engine, a Cirrus Major III, which provides 155 hp. at takeoff. Presumably American importers might support the airframe and install an American engine of similar dimensions and power, as has been suggested in other import proposals of foreign aircraft.

Although the Skyjeep has not completed its flight tests the following performance estimates under sea level conditions have been supplied by the manufacturer:

▶**Performance**—Maximum level speed 130 mph., cruising speed (2200 rpm.) 110 mph., stalling speed with flaps 54 mph., rate of climb (2500 lb. gross) 600 ft./min., takeoff distance with 5 m. wind, 150 yd.; landing run to rest, same condition, braked, 130 yd., service ceiling, 14,000 ft.; range in still air, 530 m.

▶**Specifications**—Span, 36 ft., length 21 ft. 6 in., height, 7 ft. 3 in., track 6 ft. 3 in.; empty weight, including radio, starter, generator, battery, navigation lights, landing light, cockpit lights, wing and full instruments, 1540 lb., full gross weight, 2500 lb., fuel capacity 39 gal. (carried in two "crash-proof" flexible cells in wingroots).

▶**Modifications**—Other modifications listed by the company from the earlier model include: Fnese type ailerons, increased rudder area, enlarged cabin with seats moved rearward for more leg room and front seats adjustable; redesigned panel; exhaust silencer discharging aft of cabin, reducing cabin noise, hinged top fuselage decking aft of cabin for stretcher or bulky freight, enlarged luggage compartment with 100 lb. capacity, useable alternately for two small children.

BRIEFING FOR DEALERS AND DISTRIBUTORS

▶**ADMA OFFICERS**—G. B. Van Dusen, president of Van Dusen Aircraft Supplies, Inc., Minneapolis, was elected president of the Aviation Distributors and Manufacturers Assn. at the recent French Lick, Ind., meeting, succeeding Richard Bomberger, vice president, Sensenich Corp., Lancaster, Pa. Vice presidents elected were R. W. Richardson, aviation sales manager, Goodyear Tire & Rubber Co., Akron, for manufacturers, and George W. Jalonick, III, Southwest Airmotive Co., Dallas, for distributors.

Elected to board of directors were John D. Harris, Pacific Airmotive Corp., Burbank; Frederick H. Lee Jr., R. M. Hollingshead Corp., Camden, N. J.; Arthur C. Harvey, Air Parts, Inc., Glendale, Calif.; A. E. R. Peterka, Lamson & Sessions Co., Cleveland, and Tom H. Davis, Piedmont Aviation, Inc., Winston-Salem, N. C.

▶**PROTEST BERGIN OUSTER**—Notwithstanding protests by Utah aviation leaders against the removal of Joe Bergin, as Utah Aeronautics Director after approximately 10 years in the post, the State Aeronautics Commission intends to see to it that the removal sticks.

O. H. Whittenburg, chairman of the commission, told delegates from approximately 20 aviation groups including operators and Flying Farmers, that he was responsible for relieving Bergin of his duties and for appointing Frank R. Murray, former airline employe, as his successor. Gov. J. B. Lee said he would not interfere in the matter.

What Does Rain Do To Radar?

Theoretical calculations in problem of interference are supported by scattered test data. Noise level a factor.

By Robert McLarren

It has long been known that radar pulses can be reflected by raindrops, heavy fog, clouds, etc. and it is this fact that has permitted a rapid growth in the use of radar for storm detection. When used for this purpose, the attenuation of pulse radiation by moisture condensation is a beneficial characteristic that is proving of increasing value to aircraft navigation.

However, this characteristic is wholly undesirable in radars used for aircraft detection, such as in search, ground control approach, and identifications. Hence, it is important to examine the degree of attenuation of the radar signal by rain and to examine factors permitting reduction of such interference.

▶**Data Required**—Numerous attempts have been made to measure the attenuation of radar signals by rainfall but most have not proved successful, because of insufficient rainfall, other than to provide data on the particular conditions examined. For such data to be useful they must include the widest possible range of conditions.

For example, information is needed on highly localized conditions, such as rainfall in the immediate vicinity of an airport utilizing GCA equipment. Data are needed on rainfall in the vicinity of the target, although the weather may be clear at the radar unit. Between these two extremes, data are needed on the effects of rainfall between the radar and the target, either a localized condition or a continuous rainfall across the intervening distance.

Theoretical considerations of the effect of rain and fog on the propagation of wave lengths below 10cm are reported as early as 1930.[1] One of the early experimental tests of these theories in 1935 indicated that atmospheric attenuation of 9cm waves over a line-of-sight distance of 16 mi was negligible.[2] These tests revealed an attenuation of less than 0.1 decibel per mile in a heavy rain of cloudburst proportions.

▶**Investigations**—Since theoretical studies indicate increasing attenuation with decreasing wave lengths, experimental tests using wave lengths in the 1cm and 3cm region were desirable and such trials were undertaken early in 1942 by scientists of the Bell Telephone Laboratories.[3] Although the tests were comparatively crude, they furnished the first useful experimental results in investigation of the problem. Two paths were used for the study—the 1.09cm wave length tests were made over a distance of 1260 ft., the 3.2cm. tests over a path of 900 ft.

The 1.09cm equipment consisted of a CW generator feeding an electromagnetic horn radiator mounted 4½ ft above the ground. A similar horn, mounted 21 ft. above the ground at the other end of the 1260 ft. path, supplied a double-detection receiver.

The 3.2cm. equipment utilized a CW signal generator supplying a 30-in parabolic reflector through an open-end wave guide horn placed at the focus. The reflector was mounted 35 ft above the ground. The receiver, 900 ft away, was fed from an electromagnetic horn mounted 21 ft. above the ground.

Rainfall was measured at only one point, however, at one-minute intervals. Two heavy rainfalls were measured in this manner.

These early tests indicated that attenuation of the 3.2cm. signal was at the rate of approximately 0.05 db/mi./mm/hr., using Humphrey's[4] rainfall classification system.

The 1.09cm signal was attenuated at the rate of approximately 0.3 db/mi./mm/hr.

▶**Navy Participates**—The U.S. Navy Electronics Laboratory, San Diego, Calif., took an early active interest in this problem and sought to refine the data obtained previously.[5] The fluctuations in rainfall intensity with time and distance impairs much of the usefulness of results obtained over short path distances and using a single or only a few rainfall recording points.

After surveying numerous locales, it was decided to conduct the Navy tests near Hilo, Hawaii, which has an annual rainfall of more than 250 in. In these tests, 9 rain gages were installed along a 6400-ft. path. Readings were taken every 30 sec. and this time interval was correlated to ±2 sec. by a field telephone network.

The tests were conducted using 1.25cm. radiation. The transmitting 24-in. paraboloid was fed from a klystron tube modulated at 800 cps. Peak power output was about 50 milliwatts. The receiver was fed from a 24-in paraboloid and used a superheterodyne with a klystron local oscillator driving a 30mc IF amplifier.

Receiver calibration was provided before, during, and after rainfall using a klystron signal generator with two flap attenuators. The signal was fed to the dish through a small nozzle.

▶**Results**—The accompanying graph shows the results of the tests and is a plot of signal attenuation in decibels per mile against millimeters of rainfall per hour. The curve has a mean slope of approximately 0.37 db/mi./mm./hr. Slope varies from about 0.50 at low intensities to 0.35 at high intensities.

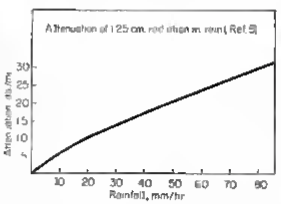
These experimental data indicate much higher attenuation than that derived by J. W. Ryde on the basis of theoretical calculations.[6] Ryde obtained an attenuation of 0.25 db/mi/mm/hr.

There are numerous possible reasons for the discrepancy between the two figures but since the tests were obtained at only 30-sec. intervals and over 700-ft. distances, it can be assumed that the fluctuations in rainfall intensity were not adequately covered.

Application of these test data to operational equipment indicates that with moderate rainfall (5mm/hr.) over a 100-mi. path, the radiated power would have to be increased by 10^{20}, or 200 decibels to provide the same power received in clear weather.

▶**CAA's Method**—A different approach was taken by the Civil Aeronautics Administration at its Indianapolis experiment station.[7] Tests were designed to evaluate the performance of S-band (3000mc.) and L-band (1300mc.) radars used to detect the presence of aircraft flying through rain or cloud formations. The trials were conducted to determine quantitatively the ratio of the received signals from aircraft to those from clouds or rain for each of the two frequencies. These tests, therefore, might be considered the reverse approach to those previously described.

The S band radar was an AN/GPN-2 unit operating with a pulse rate of 2000 on a frequency of 1290mc. L-band radar was an AN/CPS-5 unit operating with a pulse rate of 2000 on a fre-



quency of 2990mc. Both units required modification so that they would have the same characteristics and differed only in the frequency of the transmitted signal.

Design and construction of antennas for both units having identical patterns were not undertaken because of time and cost involved. As an alternative, the target aircraft was flown into and around cloud formations as carefully as possible to keep within the vertical radiation patterns of the antennas.

▶ **CAA Findings**—Results of 15 separate flights by a Douglas DC-3 show an average improvement in signal strength of 11.7db by use of the lower frequency band. (Four readings showing less than 10 db improvement are believed to be due to errors in training the antennas directly on the target.)

The CAA concluded, on the basis of these results, that almost all cloud formations of sufficient density to be visible on the 1300mc. radar scope will completely mask out all targets when viewed on the 3000mc. scope. It was found that extremely heavy rain caused masking of the first 15 to 20 mi. of range on the L-band PPI presentation.

It follows that rain attenuation of microwaves has serious consequences when transmitted wavelengths are extremely small, rainfall is very heavy, or the target is either flying in heavy rain or cloud or is separated from the source by such moisture concentrations. Under this combination of conditions, the received signal strength (as a ratio of target to rain signal strength) can be quite low.

▶ **Detection**—Ability to detect low signal strength is obviously a prime requisite of radar equipment. Unfortunately, radar sensitivity cannot be measured in terms of antenna gain alone. If this were true, then receiver sensitivity would increase with frequency, since greater antenna gains can be realized at very short wavelengths.

Fundamental limit on the size of the weakest echo which can be detected is set by receiver output noise, which originates, for the most part, within the receiver itself. This noise is created by random voltage or current fluctuations, which tremendous research and development cannot eliminate. Basic problem is that many noise sources are amplified automatically as the received signal is amplified.

Among noise sources are those created by the random motion of molecules, atoms and free charges in a resistor; fluctuations in an electron emission, and antenna radiation resistance.

Noise level of a radar receiver may be calculated by this relationship:

$$F = \frac{P_n}{kT\Delta f}$$

in which F is noise figure; P_n, amount

of noise power, k, 1.38 x 10^{-23} joules per degree Kelvin, T, temperature of resistor in degrees Kelvin, and Δf, bandwidth in cps. Value P_n is the amount of noise power which, if applied at the receiver input, would give the actual noise in the output with no other source of noise present. Value F is usually expressed in decibels so that the number of decibels above $kT\Delta f$ is a good index to the receiver noise of a radar set.

► **Set Levels**—As an indication of the noise level of typical radar sets, the following are values of noise in decibels above $kT\Delta f$ for several units: AN/APS-10 (airborne search), 15; AN/APS-15 (airborne search), 18; AN/APG-5 (turret ranging), 13; SCR-717 (airborne surface search), 11-15; SCR-720 (air search), 11-15; and AN/APQ-7 (blind bombing), 15.

Obviously, as the power of the received signal falls to the vicinity of these values, a PPI or other presentation will become completely masked by the receiver noise and no usable signal presented. Degree to which the received signal remains recognizable depends greatly on the aptitude of the individual observer.

Therefore, it is not a question of whether rain or cloud fully attenuates a radar signal but whether such attenuation reduces the signal to the near-vicinity of the noise level of the receiver.

One solution to the problem lies in the fact that the receiver bandwidth is a rough measure of the range of frequencies amplified by the receiver, which, in turn, is a measure of the noise level of the receiver.

It would follow that reductions in bandwidth would permit reductions in noise level and, therefore, increased sensitivity to signals which are attenuated by rain.

Unfortunately, however, quality of reproduction decreases with decrease in bandwidth. Hence, the radar engineer is forced to compromise the conflicting requirements for high quality and low noise reception, to produce the most sensitive receiver.

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Position Indicators Announced by G E

Two new-type, d.c. selsyn instruments for indicating position of wheels, flaps, trim tabs, cowl flaps, and other airplane components, are announced by General Electric Co., Schenectady, N. Y.

Designed to latest Air Force and Navy specifications, both instrument models are hermetically sealed and one incorporates an adjustable scale plate. Model 8DJ51GAB landing gear position indicator has been developed to replace position lights now used in many aircraft. By changing scale plate, this device can be used for other switch-controlled indications when on-off function is desired.

Model 8DJ48AAD, a round case instrument, indicates flap position regardless of degree of travel and can be modified for trim tabs and cowl tabs.

How Chromium Plate Affects Fatigue Limit

Studies at NBS yield information on steels used in aircraft. Factors of plate thickness, heating evaluated.

New data on the effect of chromium plating on the fatigue limit of aircraft steels are now available as a result of an extensive study conducted recently at the National Bureau of Standards by Hugh L. Logan.

In this investigation, sponsored by the Navy Bureau of Aeronautics, specimens about ¼ in. in diameter were machined from three lots of SAE X4130 rod and one lot of 6130 rod, whose compositions are shown in accompanying table. The X4130 steel was either normalized to a Rockwell hardness of 90-B or quenched and tempered to a hardness of about Rockwell 40-C, while the 6130 stock was quenched and tempered to a Rockwell hardness of 33-C.

After grinding, polishing, and chromium plating, the specimens were subjected to fatigue tests in an R. R. Moore type of rotating beam machine operating at 1500 or 3600 rpm. Eight or 10 specimens usually were required to obtain the fatigue limit for any one set of conditions.

► **General Relationships**—In all cases, chromium plating was found to reduce the fatigue limits of the steels studied, although the effect was less pronounced under some conditions than others.

In general, the reduction in fatigue limit increased with increased hardness of the steels. For material of a given hardness, the fatigue limit decreased with increased temperature of the plating bath.

While plate thickness appeared to have little effect on the fatigue limit of specimens plated in a bath at 55 C and a current density of 350 amp. per sq. ft., no generalizations could be made regarding the effect of this factor at other current densities and temperatures (Fig. 1).

It was discovered that the fatigue limits of specimens plated and subsequently ground to remove a part of the plating were equal to or greater than those initially plated to the same thickness as the ground specimens and tested as plated.

Other experiments showed that interruptions of the plating process did not reduce the fatigue limit of the specimens provided proper precautions were taken for continuing the plating.

► **Effect of Heating**—Chromium-plated materials often are heated to temperatures between 90 and 200 C to improve their mechanical properties by expelling the hydrogen deposited with the chromium. Hence, a systematic study was made of the effect of heating on the fatigue limit of chromium-plated steel.

Results showed that the fatigue limits of quenched and tempered specimens heated after plating decreased to a minimum value for some heating temperature between 100 and 300 C, and thereafter increased with increased heating temperatures (Fig. 2). Fatigue limits of specimens heated for 1 hour at 440 C in some cases were 87.5 percent of that of the unplated steel, whereas fatigue limits of specimens plated but not heated, and of specimens heated 1 hour (in air) at 193 C, were only about 68 and 27 percent, respectively, of the unplated steel.

Composition of Steels Used in Studying Influence of Chromium Plating on Fatigue Limits

Element	SAE X4130 Steel Lot A	SAE X4130 Steel Lot B	SAE X4130 Steel Lot C	SAE 6130 Steel
Carbon	0.35%	0.29%	0.33%	0.30%
Manganese	.53	.47	.55	.61
Phosphorus	.01	.02	.03	.03
Sulphur	.02	.02	.01	.04
Silicon	.21	.25	.24	.25
Chromium	.95	.96	1.05	1.01
Molybdenum	.19	.24	0.20	*
Vanadium	*	*	*	.22
Nickel	*	.15	.17	*

* Not determined.

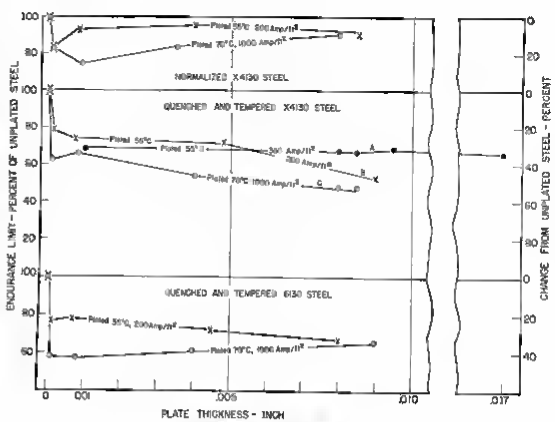


Fig. 1. Relation between endurance limit and plate thickness of SAE X4130 and 6130 steels.

▶**Causes Considered**—Three possible causes for the adverse effect of chromium plating on the fatigue limits of the steels were embrittling effect of hydrogen deposited with the chromium, cracks in the chromium, and residual stresses in the chromium.

However, it was shown that there was no simple relationship between the fatigue limit and the amount of hydrogen remaining in the chromium after a baking treatment.

Further experimental evidence indicated that cracks present in the chromium were not the principal cause of the reduced fatigue limits of the plated steels.

It is generally agreed that residual stresses in a material markedly affect its fatigue limit. Thus, in steel, compressive stresses, such as are produced by shot peening, increase the fatigue limit; tensile stresses have the opposite effect.

▶**Tubes "Tongued"**—To show the presence of tensile stresses in electrodeposited chromium and the effect of heat treatment on these stresses, thin-walled tubes of annealed steel were chromium-plated and subsequently heated to different temperatures.

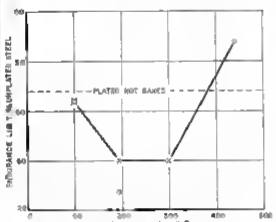


Fig. 2. Effect of baking temperature on fatigue limit of SAE X4130 steels. Circles indicate specimens baked in air, crosses are for specimens baked in organic liquids.

"Tongues"—strips about ⅛ in. wide and 2 in. long, with one end left attached—were then cut in the tubing to permit a qualitative evaluation of stresses in the chromium plate.

Tongues cut in plated tubing that had not been heated were found to bend slightly outward from the surface of the tube, indicating the presence of residual tensile stresses in the plated layer.

Baking the plated tubes at temperatures around 200 C was found to increase further the tensile stresses in the chromium, as evidenced by the greater bending of the tongue away from the tube surface.

▶**Stress Action**—From these observations, it was concluded that the decreased fatigue limit accompanying the heating at 200 C of the plated fatigue-test specimens was due to increased tensile stresses induced in the chromium plate.

This conclusion has been further substantiated by experiments showing that electrodeposited chromium subjected to a heating-and-cooling cycle increases in density and thereby contracts. Since no significant dimensional changes occur in the steel upon completion of the cycle, the steel tends to restrain the complete shrinkage of the chromium layer and thereby increases the tensile stresses in it.

If the chromium plated steel is heated to a sufficiently high temperature (above 400 C), the contractive forces in the chromium produce sufficient tensile stresses to cause plastic flow or rupture of the chromium plate, relieving the residual tensile stresses in it.

Thus, when the tubes were heated above 400 C and the tongues cut, the free ends of the tongues were depressed below the surfaces of the tubes, indicating a release of the restraint in the steel initially caused by residual tensile stresses in the chromium.

This suggests that the increased fatigue limits produced in the fatigue specimens heated above 400 C were caused by stress relief in the chromium plate accompanying its plastic flow or rupture.

New Quick-Disconnect For Ejection Seats

A "lap type" quick disconnect boot which instantly frees the pilot from all connecting lines—oxygen, "mike" and receiving headset, anti G suit, electrical heating, etc. when he is ejected from a high-speed fighter plane, has been developed at Chance Vought Aircraft.

Currently being evaluated by Navy and CV test pilots, the new quick disconnect is similar to a Vought-developed unit now in use, in that it releases automatically from an attachment point on the left console of the cockpit and stays with the pilot as he catapults from the craft. But it differs from this point on.

As the free-falling pilot prepares to leave the ejection seat and take to his parachute, he releases his safety belt and disconnect boot—attached to belt buckle—in a single motion. Before, he had to perform two operations to accomplish this same result.

Chance Vought considers the new quick disconnect a substantial advance in simplifying seat ejection procedures. The unit is more conveniently located on the pilot's lap to reduce the bulk of equipment on his chest and, with its hook up to the safety belt, takes up less of the pilot's time and attention while he is falling—when time is short.

Liftmaster Has Self-Contained Freight Lift

ON special ramp-type adapter, Jeep goes up on platform trackage for trip

UP to fuselage floor on electric-powered, 4000 lb. capacity elevator, then drives

INTO Liftmaster's cargo hold after trackage is rotated on elevator's platform

Elevator attaches to front or rear door. Capacity is two tons.

Douglas Aircraft Co., Inc.'s new DC-6A Liftmaster, freighter version of the DC-6 passenger plane, carries along its own powered, loading elevator capable of hoisting 4000 lb. from approximately truckbed height to cabin floor level.

The elevator may be attached to either front or rear cargo door and can be folded and stowed within the fuselage, behind the rear door. The installation should offer distinct advantage for military and commercial operations at airports where ground freight handling equipment is not available.

► **Elevator Operation**—Vertical component carrying the guide rails for the lifting platform is fastened to the bottom sill of the cargo door opening. Electric power for the motor operating the lift is supplied by an auxiliary gas engine coupled to a generator.

To handle small vehicles, the platform can be fitted with turntable trackage. A ramp-type adapter allows the vehicle to be driven up on the platform. When the platform is raised to fuselage floor level, the trackage can be rotated to permit the vehicle to enter the plane.

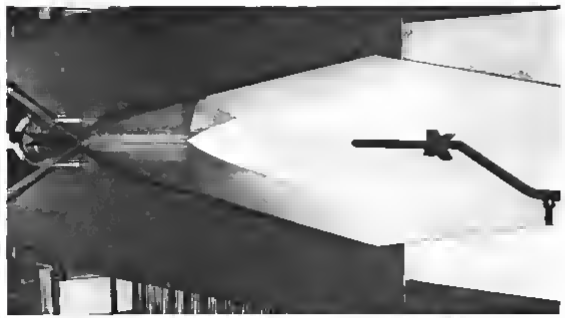
For stowage, the platform is lowered to the bottom of the guide rails and folded against the vertical component, whose fasteners are then released. Both are then pulled into the plane by electric power through a cable and pulley arrangement, and held behind the large aft section of the double rear door.

► **Production Model**—Automatically controlled cabin pressurization and air conditioning systems will permit high altitude transportation of perishable cargo. And leading edges of wing and tail have thermal anti-icing provisions incorporated.

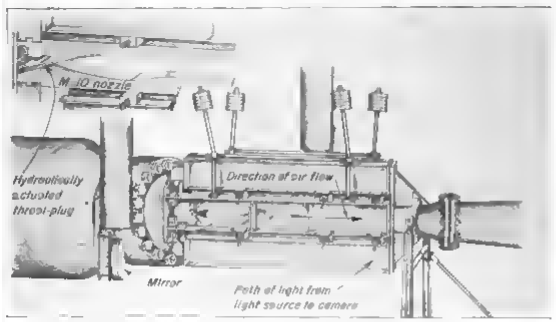
Latest plans are to fit the production model with Pratt & Whitney R-2800-CB-17 engines rated at 2500 takeoff hp. with water-alcohol injection, and 1900 hp. maximum continuous cruise. Props will be Hamilton Standard or Curtiss high-activity units.

Takeoff at full gross weight of 100,000 lb. will be within 5050 ft. at sea level. Landing field length at 85,000 lb. is 5020 ft. Absolute range with 4700 gal. of fuel is 4475 mi.

Cargo volume is 5000 cu. ft. and the craft will carry 28,800 lb. payload over long distances at better than 315 mph.



Hypersonic speeds are attained by making slot (left) about as thin as this sheet of paper.



Schematic sketch shows Mach 10 tunnel details

Caltech Tunnel Exceeds Mach 10

New facility will advance rocket and guided missile research. Believed to be world's fastest tunnel.

A hypersonic wind tunnel which can continually generate airflow speeds greater than 10 times that of sound at sea level has been developed at the California Institute of Technology under contract with the Army Ordnance Department

Designed by Caltech's Dr. Allen E. Puckett to accelerate rocket and guided missile research, the new tunnel is said to exceed by a wide margin the speed of any other known tunnel. Previous record was about seven times the speed of sound, and that was in an intermittent type tunnel which could maintain the Mach 7 rate for only a few seconds.

Besides its use to gather basic experimental data on shock waves, boundary layer, and airflow at hypersonic speeds, the installation itself will be studied to obtain information on design, performance and instrumentation to be applied in the development of future extreme speed tunnels.

The test housing of the new facility is 4 ft. long. It includes a region of acceleration downstream from the nozzle throat, followed by a 5 x 5 in. test section where the models are mounted, and finally a diffuser area where the air is slowed.

To accelerate in the expansion section, the air passes through an adjustable slot in the throat of a specially designed steel alloy nozzle. Size of the slot opening depends on the speed desired. For a Mach 10 rate, air is forced at great pressure through a tiny slit, approximately .006 in. wide. As it suddenly expands into the test section the temperature drops to about −430 F., while the pressure is reduced

to 1/1000 of normal atmospheric.

Pressure is supplied by fifteen compressors, thirteen rotary vane units and two of the double acting reciprocating type. Through a piping system controlled by valves, twelve of the compressors can be operated in parallel, or all fifteen can be arranged in series to operate in six stages.

Air from the battery of compressors flows first into a large supply reservoir before entering the nozzle. The tank is 12 ft long and 3 ft in diameter, with steel walls varying in thickness from 1¼ to 2½ in. It weighs about 6 tons. An hydraulically-operated plug blocks air from passing into the throat slot until the required pressure is built up in the tank.

Since the air must be free of moisture, it is processed by a drier before it enters the tunnel, which can be run 10-20 hr before it is necessary to reactivate the drier. To prevent moisture condensation on the outside of the plate glass sides of the test section during the early part of a run, the installation has double windows with a special drying material between.

A schlieren optical system is used to photograph airflow past the model. This includes an arrangement of mirrors which pass parallel light through the glass windows of the test section. Shock waves act as miniature lenses to disturb the parallel beam, and the disturbance is recorded by a specially designed camera. This can photograph an 8-in. circular area at one time. The entire system can be moved along the tunnel on an overhead track to show what happens upstream and downstream of the model.

Operation of the tunnel is under the supervision of Dr. Henry T. Nagamatsu of the Caltech Guggenheim Aeronautics Laboratory.

Texas Tunnel

Another supersonic air duct capable of creating speeds from 5000-7500 mph is nearing completion at the University of Texas.

Built under contract with the Navy for basic research into airflow problems related to guided missile development, the installation will have a large torpedo-type compressor to deliver air at 3000 psi, and a battery of high vacuum pumps to provide motive power.

To operate the tunnel, an air charge first will be built up in a high pressure reservoir, while, at the same time, a low pressure tank on the opposite end of the duct will be evacuated. Then, by turning a quick-opening valve, the pent up air in the reservoir will be released suddenly to blast through the duct into the vacuum chamber at speeds reaching 10 times the velocity of sound.

ENGINEERING FORUM

Disputes "G" Value

Your treatment of the National Air Races, in the Sept. 12 issue, was well presented. Coverage was adequate and informative, even to those who were there. Your editorial comment was both pointed and judicious.

Performance presented by the participating pilots was well nigh perfect and too much cannot be said for their skill and stamina. However, it only requires the application of a little basic physics to show that your Industry Observer was a bit over zealous in stating "North American F-86 fighters flew the jet division of the Thompson Trophy Race in a steady bank which held a constant 6.7G on its pilots . . ."

To hold a steady acceleration the path must have had a constant curvature—a circle. From basic physics the centrifugal force is

$$F = mr\omega^2$$

where F is centrifugal force; m, mass of the airplane; r, radius of turn, and ω, angular velocity.

Now,

$$m = W/g \text{ and } \omega = V/r$$

where W is weight of the aircraft, g, acceleration of gravity, 32.2 fps²; and V, linear velocity.

Substituting

$F/W = V^2/gr = G_H$ = acceleration in the horizontal plane.

Resolving the horizontal acceleration, G_H, with the vertical acceleration, 1, gives the G load on the pilot.

$$G = \sqrt{1^2 + G_H^2}$$

Solving for our particular case,

V = 586 mph = 860 fps (from AVIATION WEEK, Sept. 12, page 15)

$r = c/2\pi = 15/2\pi = 7.38$ mi. = 12,600 ft.

$G_H = 860^2/(32.2 \times 12{,}600) = 1.82$

$G = \sqrt{1^2 + (1.82)^2} = 2.08$

It may be argued that this represents the minimum steady G. Assuming that the statement on page 14 (Sept. 12) that ". . . the Sabres actually flew nearly 25 miles instead of 15 for each of the laps" is correct and that it was made at the maximum speed of 635 mph (measured as though over a 15-mile course) we can repeat the calculation to get a maximum value of steady G.

$V = 635 \times (25/15) = 1060$ mph = 1550 fps, a highly improbable speed, even for an F-86.

$r = 12{,}600 \times (25/15) = 21{,}000$ ft.

$G_H = 1550^2/(32.2 \times 21{,}000) = 3.56$

$G = \sqrt{1^2 + (3.56)^2} = 3.70$

which is still far short of 6.7G.

An easier way of visualizing the same result is to consider the angle of bank. The lift in the vertical direction must equal the weight of the airplane. The lift normal to the wing, which is the weight of the airplane times the number of Gs being pulled must be sufficient that its vertical component equals the weight. Therefore,

$$W = L \cos \phi$$

where ϕ is the angle of bank,

or $L/W = G = 1/\cos \phi$

This assumes, of course, that the airplane maintains constant altitude, which was necessarily the case so near to the ground.

At 6G $\phi = \cos^{-1} 1/6 = 80\frac{1}{2}$ deg.
At 2G $\phi = \cos^{-1} 1/2 = 60$ deg.

It was obvious to the spectators that the angle of bank was nearer 60 than 80 deg.

JAMES K. MARSTILLER,
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Dayton 9, Ohio.

Slated for Turboprop

I would like to comment on the article "RAF Tests New Anti-Sub Planes" on page 16 of the Oct. 31 issue of your magazine.

The last paragraph of the article states that the exhaust outlets on both sides of the fuselage at the wing's mid-chord (of the Blackburn Y.A.5) could be adapted without change for gas turbine jets.

However, it is apparent that these outlets are already designed for gas turbine jets, since from a study of the photograph it can be seen that there are six individual exhaust stack stubs at the nose of the fuselage which would be required on both sides for a Rolls-Royce Griffon engine. There is no evidence of an exhaust collector tube, and if there were a collector tube the skin could be faired over these stubs for aerodynamic considerations.

Also, from an elementary study of aircraft powerplants, the exhaust outlets at the wing mid-chord would be detrimental to both the performance of a reciprocating engine and from drag considerations of the airframe. Also, the ducting necessary to exhaust the Griffon engine at this point would be expensive in space and duct losses.

Therefore, it seems apparent that the Blackburn Y.A.5 has been designed for a turboprop and the present engine is substituted for test purposes.

However, I like your magazine very much and read it quite avidly.

BOHDAN I. WANDZURA
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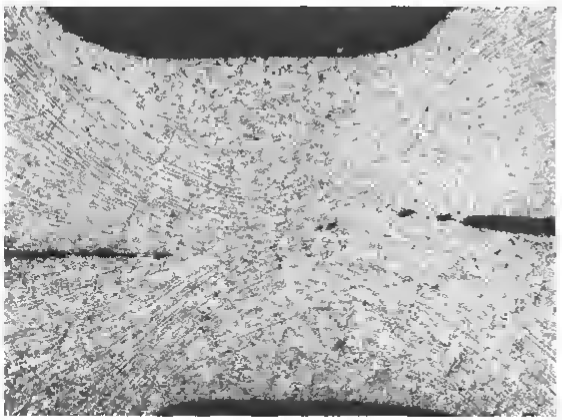
Los Angeles 37, Calif.

(Frederick R. Brewster, McGraw-Hill World News London bureau chief who sent in the story in question, writes:

"Reader Wandzura's sharp eyes have spotted an error, all right. The story should have made it clear that the large exhaust outlets in the Y.A.5's fuselage at the wing's midchord are intended for the turboprop engine which will be fitted shortly. The Y.A.5 was laid down with the intention of installing a double turboprop engine initially—a double Naiad. But the single Naiad engine, which has been on bench test for over a year now, as well as being flight-tested in the nose of an Avro Lincoln, has not developed anywhere near the expected 1500 s.h.p. Consequently, the Naiad has been dropped and the double Mamba tapped as the probable power unit for the Y.A.5. Installation of the Rolls-Royce Griffon piston engine, as pointed out in the article in AVIATION WEEK, is a temporary measure only."—Ed.)



MICRO-SECTION of a pressure weld, showing lines of flow. Note absence of weld line.

Pressure Welding Being Studied

Piper investigating merits of new British-developed process offering production time-and-cost savings.

One aircraft manufacturer is wasting no time getting a license on a recently developed cold welding technique in which metals simply are forced together by skillfully applied pressure—replacing methods using rare gases and electricity. Already introduced in England by the developer, the General Electric Co., Ltd. (no relation to the American company), the process has been available to U. S. firms only a few weeks.

The aircraft company interested in using the process is Piper Aircraft Corp., Lock Haven, Pa. Piper currently is negotiating with the Koldweld Corp., New York City, which controls all licensing rights in this country.

▶**Special Features**—Piper's desire to license the new welding process is explained by Koldweld's reports that:

- No special skill is required to operate welding equipment.
- Low cost tools make adoption of process feasible even to the smallest firms.
- Less materials handling is required, since welding equipment usually can be carried to any point on the production-line in man's pocket or small handbag.
- It is faster in some operations than other welding processes.
- It is adaptable for welding materials having wide range of thicknesses, from thin aluminum foil to heavy metals.
- It is superior to other welding processes in producing vacuum or moisture-proof containers, since blow holes, created by expansion and contraction of gases, are eliminated.
- It eliminates need for flux, cleaning joints after weld, and shielding masks.

According to William Dubilier, president of Koldweld and founder of Cornell Dubilier Electric Corp., the new technique "will revolutionize industrial and job welding of many metals, particularly aluminum."

Besides its use with aluminum alloy, the process reportedly can be applied to such nonferrous metals as cadmium, lead, copper, zinc, nickel and silver—even to the extent of joining dissimilar metals. It is believed further developments will make possible its use with soft steel and other ferrous products. Currently, the maximum thickness which can welded by hand is about ¼ in. But this can be increased, the firm says, by making larger tools.

▶**Principle**—Cold welding is based on the principle that sufficient pressure applied in a specific manner to two pieces of metal will cause them to flow together to become a single homogenous mass at the point where force is exerted. The pressure is stated to cause molecular fusion at this point.

Welding some types of joints is so simple that the only tool needed is a pair of small pliers incorporating special dies on the jaws. Pieces of aluminum foil, only .001 in. thick, have been welded with a center punch.

An important secret of the process, known only by Koldweld and the British firm, is the formula regulating the planform shape and depth of the dies used to make the pressure welding imprint in the metal. It is known, however, that die shapes vary, depending on the composition and thickness of the metal to be welded, and the type of joint to be made. Pressure varies, with a maximum of 20 tons psi. used to join the hardest aluminum-alloys. Force can be applied gradually or through impact.

A critical requirement of cold welding is removal of oxide film from surfaces before parts are joined. One method of accomplishing this is by polishing with a wire brush. Even contamination caused by handling material will prevent formation of a satisfactory weld. Once removed, the oxide film returns slowly, permitting welds to be made several hours after polishing.

▶**Techniques Developed**—So far, three techniques have been evolved in the process, the straight, ring, and continuous seam welds. The straight weld can be used for box seams, sealing tube ends and for other forms of lapped joints. Important applications of the ring weld are sealing flanged tubes in fabrication of hermetically sealed containers, joining two disks together to form a pressure diaphragm, welding flanged tubes to plates for making hose connections, etc. The seam weld is especially useful in making conduit and other tubes. A machine has been developed which automatically polishes material to remove oxide, forms metal into tubing with seam, welds and then trims finished tube.

▶**Improvement Seen**—By combining the Koldweld and argon weld processes Dubilier says its possible to produce rugged metal vacuum tubes for radios and other electronic equipment. Cold welding doesn't equal arc welding when it comes to producing strong joints, but the company believes its only a matter of time before this is possible.

For the present, it is recommended the process be used only on parts which are not primary load carrying structures. Dubilier thinks future developments will permit its use on aircraft skin—replacing rivets. Since flush-type seams can be made, it is possible the process even could be used for surfaces on supersonic aircraft.

▶**Piper Program**—After receiving its license, Piper Aircraft plans to put cold welding through an extensive test pro-

gram of its own Experimental parts will be subjected to actual flight conditions for long periods The company wants to make certain that parts welded under this process are capable of standing up to vibration, handling, fatigue and other service requirements before it adapts the technique to its production line

August C Esenwein, executive vice president and general manager of Piper, emphasizes that one feature of pressure welding—reduction in metal thickness at the joint caused by die imprint—will be given an especially thorough study to determine its effect on material strength

If the process comes up to expectations, it first will be used in production of non structural parts, with the possibility, after long observation of these parts in service and improvements in technique, that it eventually will have more widespread applications in airframe assembly of structural members

Esenwein believes that in many applications cold welding could become the "logical substitute for riveting and spot welding" He sees the chance of large savings in fuel tank construction Tanks now are formed in two sections on a hydraulic press, then joined by welding It takes one man about ¾ hr. to gas weld a 9 ft seam joining the sections Esenwein thinks this operation could be cut down to 5 10 min with cold welding

▶ **License Program**—Tentative licensing plans are that the licensee will pay a fixed fee of about ½ of 1 percent of the value of each unit produced under the process Dubilier claims this charge is less than the cost of wrapping the part for shipment The fee will not be based on the total value of a device incorporating several cold welded parts It will effect only the units involved

After a license is granted, Koldweld supplies the firm with all accumulated data on the process, including blue prints for tools, tables and formulas regulating die shape, pressure application, and welding procedures Koldweld also plans to help firms adapt the process to their own particular production requirements and will supply the tools if the licensee doesn't care to make his own

▶ **Lockheed Interested**—Lockheed Aircraft Corp, Burbank, Calif, is another firm which has shown more than casual interest in the Koldweld process But it has no immediate plans for taking out a license This company also is watching other welding developments at the Aluminum Co of America Alcoa is experimenting with pressure welding at both room and elevated temperatures None of its developments in this field as yet are scheduled to be licensed out to other firms

Latest Air Force Bid Awards

Air Materiel Command Procurement Division makes available to AVIATION WEEK the latest bid awards, shown on this page Requests for further information should be addressed to Contracting Officer, AMC, Wright-Patterson AFB, Dayton, Ohio, attention MCPPSX72

ABSTRACTS

For cap assemblies (00-764):
Companies sharing—Tubing Seal Cap Inc., Los Angeles on a bid of $1342 44, Air Associates, Inc., Teterboro, on a bid of $753 50 Manhattan Lighting Equipment Co, New York on a bid of $335 and Frank & Warren Brooklyn on a bid of $705

For 48 demagnetizer assemblies (40-1074):
Companies sharing—Graybar Electric Co, Inc, Dayton on a bid of $1220 Stanhope Products Co, Brookville O., on a bid of $3572, Laboratory Equipment Corp, Mooresville, Ind., on a bid of $144 50 and Bendix Aviation Corp, Eclipse-Pioneer Division, Teterboro, on a bid of $76 90

For welding power operated positioners (0d-100):
U S Pipe & Mfg Co, San Francisco, on a bid of $75 501

For installation 000 volt d c. switch gear assy (00-137):
Hughes Simonson Engr Co. Dayton, on a bid of $4095

For washers (0d-141):
Companies sharing—L J Barwood Mfg Co Inc, Everett Mass. on a bid of $20 65, Geo K Garrett Co., Inc. Philadelphia, on a bid of $2240 New Haven Clock & Watch Co, New Haven, on a bid of $4540 and Camloc Fastener Corp, New York on a bid of $20

For 4000 cones (00-142):
Abbot Machine Co., Milwaukee, on a bid of $17 450

For 682,500 rowlock assemblies (00-160):
Companies sharing—Dzus Fastener Co. Inc., Babylon, N Y on a bid of $4734 90 and Monadnock Mills San Leandro, Calif, on a bid of $1348

For turnbuckle assemblies (00-167):
Companies sharing—Arro Bolt & Screw Co Inc. New York, on a bid of $721.25, American Chain & Cable Co. Inc., Automotive & Aircraft Div Detroit, on a bid of $712 80 Aero Supply Mfg Co, Inc. Corry, Pa., on a bid of $3041 and Ruland Mfg. Co Watertown Mass., on a bid of $1455

For 20,000 pounds naphthalene (0d-7d2):
Koppers Co. Inc New York on a bid of $2563

For silvercyanide and silver nitrate (0d-10d):
Goldsmith Brothers Smelting & Refining Co, Chicago on a bid of $48 755 85

For bushing assembly (00-170):
Companies sharing—Jnsitile Mfg Co., Chicago on a bid of $7735 74 Fuel City Metal Works Inc Clarksburg W Va. on a bid of $1438 V L. Graf Co New Baltimore Mich. on a bid of $2545 Browning Brothers Inc. New York on a bid of $451 84 and Industrial Precision Products Co, Chicago on a bid of $816

For 1000 lamp assemblies (0d-170):
Stewart R. Browne Mfg Co., Inc., New York on a bid of $45 787 55

For 10,000 yards waterproof fabric (0d-182)
American Finishing Co, Memphis, on a bid of $8478 75

For 24 parachute drop test dummies (0d-183)
Sweebrock Aviation Co., Inc., Fort Wayne on a bid of $3315

For 8400 rectifier bolts (00-100):
Companies sharing—Westinghouse Electric Corp., Westinghouse Lamp Div, Pittsburgh, on a bid of $1747 80, General Electric Co Land Equip Div Dayton, on a bid of $5915, and Radiant Lamp Corp., Newark N J on a bid of $2433 50

For 50,000 feet acetylene hose (00-1d8):
Companies sharing—Boston Woven Hose & Rubber Co, Cambridge, Mass on a bid of $2455 34 and Goodyear Tire & Rubber Co, Inc Akron on a bid of $4347 60

For 200 000 gallons fuel (0d-2d8):
Phillips Petroleum Co., Bartlesville, Okla. on a bid of $22,980

For 1800 parachute assemblies (5d-070):
Pioneer Parachute Co., Inc. Manchester Conn., on a bid of $177 565

For 224 transformers (0d 230):
Weston Electrical Instrument Corp., Newark N J. on a bid of $3633 54

For adapter, apron etc (0d-90):
Companies sharing—Coogan Co., North Hollywood, Calif., on a bid of $1293 50 Hubbell & Miller Co New Rochelle N Y, on a bid of $27 450 Semon Bache & Co New York, on a bid of $107 Abrams Instrument Corp. Lansing Mich on a bid of $8378 Pako Corp Minneapolis on a bid of $0318 Eastman Kodak Co Rochester, on a bid of $4084 35 Robinson Aviation Inc, Teterboro, on a bid of $7815, Williams Brown & Earle, Inc, Philadelphia, on a bid of $4727 20 Graflex Inc Rochester on a bid of $22 385 18 Peck & Harvey Chicago, on a bid of $402 Camera Equipment Co, New York on a bid of $85 55 Columbian Enameling & Stamping Co., Terre Haute on a bid of $263 25 Burke & James Inc. Chicago, on a bid of $7550 80 Minnesota Mining & Manufacturing Co St. Paul on a bid of $3522 85 Morse Instrument Co Hudson Ohio, on a bid of $17 022 80 Seal Inc Shelton Conn, on a bid of $4737 Penn Camera Exchange Inc. New York on a bid of $3427.45 Stephenson Film Corp, New York, on a bid of $4553 08 and Arel, Inc, St. Louis on a bid of $74 795 15

For 74 967 oxygen tubes (0d-89):
Dayton Rubber Co., Dayton, on a bid of $48 256 93

For 420 variacs—variable transformer (0d 2d8):
Companies sharing—Standard Electrical Products Co Dayton on a bid of $10 155 and General Radio Co., Cambridge Mass, on a bid of $7250

For 2 flight equipment trailers (00-434)
Grand Central Airport Co. Glendale, on a bid of $3828

For aircraft and airduct hose (00-274):
Companies sharing B F Goodrich Co, Akron O on a bid of $2027, Aeroquip Corp Jackson, Mich. on a bid of $34 782 Hewitt Rubber division Hewitt-Robins Inc. Buffalo, N Y on a bid of $3728 45 United States Rubber Co. New York N Y on a bid of $81 777 40 and Arrowhead Rubber Co Vernon Calif on a bid of $7225 44

For disconnector and plug assembly (00-284)
Aero-Motive Mfg Co. Kalamazoo Mich., on a bid of $3880

For 4 trailers (50 287):
Stewart Truck Bodies Inc., Brooklyn, N Y on a bid of $2400

For bolts (0d-364):
Companies sharing Thompson Products Inc. Bell Calif., on a bid of $6327 Aircraft Hardware Mfg Co. Inc. New York, N Y on a bid of $1427 and Lamson & Sessions Co Cleveland O, on a bid of $1364 25

For 40,650 ft cushion extrusion (0d 288)
Companies sharing Los Angeles Standard Rubber Inc, Los Angeles Calif., on a bid of $5285 80 and Douglas Aircraft Co Inc. Santa Monica, Calif on a bid of $284 25

For cord (00 278):
Companies sharing Linen Thread Co Inc, Paterson, N J on a bid of $34 250 and South Eastern Cordage, Cleveland O on a bid of $1400 40

For 2478 tow targets and flag weights (00 88)
W A Apple Textile Mfg. Inc., Dayton, O on a bid of $41 138 75

For 8704 sheets glass sheet, laminated (00-224)
Pittsburgh Plate Glass Co., Pittsburgh, Pa., on a bid of $37 152 54

For 1750 aircraft storage batteries (00-297)

Companies sharing—Auto-Lite Battery Corp., Toledo, O., on a bid of $31,897.84, and Reading Batteries, Inc., Reading, Pa., on a bid of $17,564.00.

For 6340 base adapter tubes (50-221):
Specialty Assembling & Packing Co., Inc., Brooklyn, N. Y., on a bid of $5304.

For 169,000 ft. elastic cord (50-240):
Russell Mfg. Co., Middletown, Conn., on a bid of $7127.60.

For 15,000 gal. oil (50-290):
Independent Mfg. Co., Philadelphia, Pa., on a bid of $12,104.

For 30,000 gal. agreol brightener (50-132):
Companies sharing—Wyandotte Chemicals Corp., Wyandotte, Mich., on a bid of $7350, and Sewall Paint & Varnish Co., Kansas City, Mo., on a bid of $8250.

For 2115 cable assemblies (50-170):
Mines Equipment Co., Div. Joy Mfg. Co., St. Louis, Mo., on a bid of $62,054.70.

For marker beacon receiving set (50-188):
Elitron, Inc., Jackson, Mich., on a bid of $17,077.30.

For 1,000 500v bus bar sockets (50-270):
Graybar Electric Co., Inc., Dayton, O., on a bid of $6270.

For lens assembly (50-260):
Line Material Co. of Pennsylvania, East Stroudsburg, Pa., on a bid of $2687.50.

For blankheads (50-101):
Companies sharing—Ohio Valley Slate Co., Cincinnati, O., on a bid of $6204.24; Bergsma Elect. Co., Grand Rapids, Mich., on a bid of $1742; and Roth Office Equipment Co., Dayton, O., on a bid of $851.

For booth (50-103):
Companies sharing—Binks Mfg. Co., Chicago, Ill., on a bid of $12,147, and Schmieg Industries, Inc., Detroit, Mich., on a bid of $11,670.

For clamp, hose (50-209):
Companies sharing—Breeze Corps., Inc., Newark, N. J., on a bid of $142,440, and Ideal Clamp Mfg. Co., Inc., Brooklyn, N. Y., on a bid of $132,076.

For filling access door, (50-210):
Companies sharing—Firestone Tire & Rubber Co., Los Angeles, Calif., on a bid of $5,437.50; United States Rubber Co., Mishawaka, Ind., on a bid of $63,056.40, and B. F. Goodrich Co., Akron, O., on a bid of $11,278.45.

For reflector, taxi strip (50-230):
Companies sharing—Minnesota Mining & Manufacturing Co., St. Paul, on a bid of $34,180, and A. & Z. Engineering Co., Covington, Kentucky, on a bid of $3700.40.

For arrows and indicator assemblies (50-200):
Companies sharing—Dayton Wheel Co., Dayton, on a bid of $2450.40, and Revere Electric Mfg. Co., Chicago, on a bid of $317.40.

For 2000 wind indicators and hood assemblies (50-277):
Hawthorn Mfg. Co., Kansas City, Mo., on a bid of $2743.70.

For altimeters (50-2420):
Kollsman Instrument Div. of Square D Co., Elmhurst, N. Y., on a bid of $325,427.80.

For aluminum alloy—rolled shape (50-167):
Du Bois Metals Corp., Long Island City, N. Y., on a bid of $1743.

For light assemblies (50-173):
Grimes Mfg. Co., Urbana, O., on a bid of $3230.40.

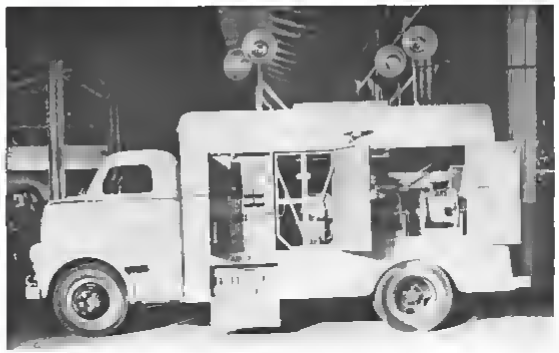
For 10,000 adapter assemblies (50-199):
Companies sharing—Kings Electronics Co., Brooklyn, on a bid of $810; East Coast Electrical Supply Co., Inc., New York, on a bid of $1060.80, and Dentsch Co., Los Angeles, on a bid of $1372.

For 42,735 mount insulators (50-212):
Companies sharing—Lord Mfg. Co., Erie, Pa., on a bid of $5504.30, and United States Rubber Co., New York, on a bid of $3710.09.

For clamp, cable (50-207):
Companies sharing—Breeze Corp., Inc., Newark, N. J., on a bid of $4720; Air Associates, Inc., Teterboro, on a bid of $354.00, and Adel Precision Products Corp., Huntington Division, Huntington, W. Va., on a bid of $614.51.

For transformer (50-236):
Sola Electric Co., Chicago, on a bid of $3030.

For switch, generator control relay and test data (50-200):
Hartman Electrical Mfg. Co., Mansfield, Ohio, on a bid of $24,902.



Power Supply for Large Aircraft

Portable ground unit for Stratocruiser saves money and time and may set standard for other big planes.

A new device for big planes is solving an expensive, time consuming problem in servicing Boeing Stratocruisers. After extensive testing, and expensive modification, it now shows promise of saving time and money for its present users —and of becoming the type of unit for any other airline using big planes.

The trend to larger aircraft over the years has been accompanied, almost unnoticed, by a proportionate growth in the size of ground power units used for line checks.

▶**Twice as Much**—But the largest capacity portable unit used until recently has generated about 1000 amps., and the Stratocruiser demands up to 2000. This brought about development of the Onan Energizer almost concurrent with first Stratocruiser operations. In effect, it is a grown-up, complex descendant of the simple, uncomplicated battery cart.

Made by D. W. Onan & Sons, Inc., Minneapolis, more than a score of these units have been bought by Pan American Airways and Northwest Airlines at a price of about $23,000 each. Despite the initial cost, Pan Am believes the trucks will be not long in paying for themselves in cutting to a minimum the time required to run major electrical system checks.

▶**First of Kind**—Since it is the first of its type and represents an almost radical departure from the typical electrical ground power unit, the Onan Energizer could reasonably be classed as an experimental model which, as experience in its use accumulates, will undergo broad modifications. Like new aircraft, it, also, has had its "bugs." But many of these already have been worked out, according to Pan Am engineers.

Reasoning that present large aircraft, such as the Stratocruiser, will become more common, and that future planes will place greater demands on ground power equipment, Pan Am believes oversize electrical power units like the Onan model are here to stay and, with improvement, will become standard fixtures at airports.

Pan American has pinpointed its Onan trucks at major terminals on its route pattern. Generally, it uses the 2000-amp. units only for servicing the Stratocruiser and Lockheed Constellation 749s. Intermediate points in the PAA system are equipped with smaller units, since extensive maintenance work is not ordinarily carried out at these places. Other Pan Am aircraft are serviced by portable power units in the 1000, 500, and 175 amp. class.

▶**Saving Time**—Since the Onan units are mobile, yet capable of delivering high amperage current, they remove the need for moving planes to maintenance docks to be serviced. And time and money are not wasted in setting up small ground units in parallel to produce the current needed.

Not only are aircraft kept out of the air longer when they are moved to a dock, but often the dock itself is not available. Pan Am, for instance, currently has only two docks for servicing its Stratocruisers at New York International Airport.

▶**Description**—The Onan truck, with a 140-hp. Hercules gasoline engine to drive two generators, one 50 kw., d.c., the other 15 kw., a.c., will supply sufficient power to the plane to start all engines, run all instruments and accessories, air-conditioning systems, the galley, heaters, interior lighting and communications system. The d.c. generator is rated at 1750 amp., 28.5v. at 1200 rmp., while the a.c. unit furnishes 60 cycle current, 120/208v. at 1800 rpm.

For continuous running, the Stratocruiser takes 1440 amp., while 1750 amp. are required when its engines are being started one at a time. Surge conditions of the plane's equipment demands 2800 amp. for momentary periods.

In addition to generators, the truck incorporates a compressed air system for inflating tires and other pressure needs, four large floodlights which fold into the roof when not in use, complete CO_2 fire extinguishing equipment and a panel containing all meters and controls.

Machining Aid

Simple workshop unit for testing machinability of ferrous and non-ferrous metals is announced by **Vanton Equipment Corp.**, Empire State Building, New York City. Known as M.S.E. Schlesinger Machinability Tester, instrument investigates two basic characteristics of metals.

It measures "specific cutting resistance" exerted by material against penetration of standardized kind and shape of cutting tool. This measurement is made for standardized chip area with result that unit's dial indicator reads directly in lb./.001 sq. in. Measurement of cutting resistance is a direct indication of tangential cutting force only, which, so far as power consumption of machine tool is concerned, is only force relevant.

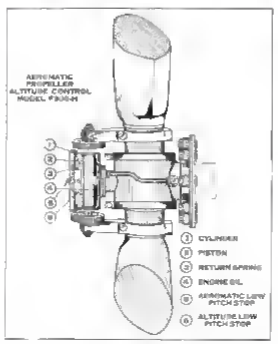
Device also measures "abrasive effect of same work material on hardened calibrator. This effect of abrasion is determined by measuring abraded flat on a standardized 10mm. test ball brought into contact with work material under known pressure and for given time. In this manner, actual wearing effect of work material on cutting tool is simulated on standard test ball.

"Machinability Index" is defined as machining effort, determined by multiplying measured specific cutting resistance by measured abrasion factor. These factors are reproducible under same general conditions.

Plexiglas Reflectors

Navigation light reflectors, produced by **Southwest Airmotive Co.**, Dallas, Tex., project far enough above upper surfaces of wing tips to be easily seen from cockpit, enabling pilot to tell at quick glance whether his lights are working.

Located inboard of lights on same mount, Plexiglas units incorporate holes corresponding to those on standard wing tip installations and can be used on several different types of aircraft. They are available in various shapes, depending on taste of individual pilot. Reflector (shown) is being installed on wing tip of Beechcraft Bonanza.



Prop. Altitude Control

Development of Strato Cruise control for Model F200 automatic variable pitch propeller, suitable for aircraft powered by 65-165 hp engines, is announced by **Aeromatic Propeller department of Koppers Co., Inc.**, Baltimore, Md.

CAA-approved device, similar to control for Aeromatic 220 prop placed on market earlier this year, enables pilot to override automatic operation of propeller and select engine speed desired for cruising at altitudes above those normally used. While also designed to supplement prop's automatic feature by assuring availability of rated rpm of engine during takeoff and climb at any altitude up to service ceiling of aircraft, control still does not interfere with Aeromatic action at takeoff regardless of position of its cockpit control.

Device consists of cylinder housing hydraulically actuated piston which controls positioning of low pitch stop through linkage system coupled to piston and both prop blades. Installation requires use of propeller hydro-control—standard equipment on Lycoming 100 or 115 hp., and Franklin 165 hp. engines—to provide pressure oil for the system. Pilot operates unit through push-pull cable leading to cockpit knob.

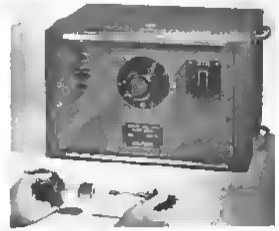
Strain Recorder

Strip-chart strain recorder for use in stress analysis with SR-4 bonded resistance wire strain gages is announced by **Baldwin Locomotive Works**, Phila. 42, Pa. Features of device are easy readability with 9½ in. wide chart scale, two chart speeds of 6 and 180 in./hr., and accommodations for a two-arm and four-arm strain bridge. Slowly varying strains can be recorded for as long as 10 days without changing chart.

Instrument is special adaptation of Leeds & Northrup Speedomax Type G, Model S recorder with simple adjustments for strain gage characteristics, strain ranges, and for Wheatstone bridge circuit. Basically, circuit is d.c. potentiometer type for measuring output of a strain gage bridge. D.C. power supply is built into recorder and voltage regulator is supplied separately.

Important feature of circuit is arrangement for directly standardizing potentiometer range in proportion to voltage which is supplied to strain gage bridge.

Circuit is adjusted by two-position bridge supply switch (3 or 6v.) and by a rheostat calibrated in gage resistance from 50 to 50 ohms. Microinch ranges of recorder are 1000, 2000, 5000, and 10,000 on 6v. bridge, and 2000, 4000, 10,000 and 20,000 on 3v. bridge. Continuous gage factor adjustment covers range from 1.7 to 2.2. Zero adjustment control and range extender switch provide approximately ±15,000 microinches per in. movement of balance point with 120-ohm gages.

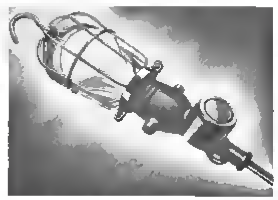


Light Source

For super brilliant light source in schlieren optical systems, shadowgraphs, interferometers, monochronometers, and high-speed photography, Ames Type-A mercury arc lamp, announced by **Huggins Laboratories**, 748 Hamilton Ave., Menlo Park, Calif., is reported to afford light intensities up to 90,000 candles per sq. cm. Shown in photo are lamp-holder with lamp extracted, and, in background, controllable a.c. power supply. Light output is 65 lumens per watt; power input 2 kw—1.2 amp. at 1750v.

Arc dimensions are 1.125 in. by 0.039 in. Cooling is accomplished with ordinary tap water (2½ gpm.). Alternately, closed-circuit distilled water system can be used. Average life at rated maximum brilliance is 5 hr., appreciably more at reduced voltages.

Quartz accessories can be supplied for operation in ultraviolet region. Direct current, flash, and stroboscopic power supplies are under development for special applications.



Fast-Holding Light

Self supporting' trouble light, Henco Magnalume 300," is offered by **C. J. Hendy Co.**, Dept. AC, 27 Main St., San Francisco, Calif., for easing maintenance jobs on aircraft and in plants. Alnico V Magnet, molded into case is deep-flux type capable of holding through thick paint and grease, with approximately 17 lb. grip.

Unit has enclosed switch, 25-ft. cord, and Neoprene rubber is used throughout to prevent deterioration in oil and grease.

Damon

TWA Says

TRANSACTION is a "sell-out" conceived in secrecy and designed to further PAA's chosen instrument ambitions

PAA IS "OPPOSED to private enterprise and the free and open competition that form the life blood of American industry"

A NEAR MONOPOLY would force TWA to the wall

"WE ARE GOING TO WIN because monopoly is not in the public interest"

Public Counsel Says

"THE FURTHER this deal goes, the worse it looks"

AOA ISN'T WEAK. There's no reason for pessimism about its future. Not necessary for AOA to sell out.

TRIPPE "is willing to go to extraordinary lengths to acquire AOA," but wasn't too enthusiastic about it last May.

TRIPPE OUT-TRADED C. R. Smith and the American board of directors in first agreement.

NOW that American's financial condition is improved, why is it staying with the deal? Is it because the directors don't want to lose face?

AA Says

CASH SALE is fresh proposition, free of any obligation to continue old contract. So contentions AA was stampeded into deal are irrelevant.

WANTED CASH all along, but Trippe still wanted to avoid cash deal when new pact was negotiated last summer. Smith insisted on "new deal."

"NO IMPELLING REASON" for AA to make bad trades with PAA, Smith told Trippe. AOA could be liquidated at a reasonable price.

HAD NO OBLIGATION to extend pact unless it was advantageous.

Trippe

PAA Says

CAB isn't a broker to get the best price. It should just see that negotiations are on the up-and-up.

AMERICAN will have no more interest in Pan American after merger than it now has. TWA will benefit by having a powerful competitor removed.

AOA STOCKHOLDERS would be more than $7 million ahead of the old arrangement. would get more than market price for their shares.

How Fair is PAA-AOA New Deal?

First birthday of trans-Atlantic merger case passes with TWA renewing attack on modified plan.

By Charles Adams

The "new deal" whereby Pan American Airways would purchase American Overseas Airlines' routes and assets for $17,450,000 in cash instead of nearly $19 million in PAA stock has failed to mollify bitter critics of the merger.

This month, as the so-called North Atlantic Route Transfer case became a year old, opponents of American Airlines' revised arrangement for disposing of AOA said the transaction was still a "sell-out," conceived in secrecy and designed to further PAA's chosen instrument ambitions. American and Pan American replied that their supplemental agreement (reached last September) eliminated principal objections to original pact signed Dec. 13, 1948.

▶**TWA to Win?**—TWA President Ralph S. Damon last week asserted that the near monopoly which would result from the proposed merger might easily force TWA to the wall. "But I think we are going to win this fight because monopoly is not in the public interest," Damon declared.

Coincidentally, Warren Lee Pierson, TWA board chairman, accused PAA of "being opposed to private enterprise and the free and open competition that form the life blood of American industry." Damon and Pierson made their attacks on Pan American as a Civil Aeronautics Board examiner was preparing to issue a report recommending approval or disapproval of the modified merger agreement.

▶**Stockholders Ahead**—Although AOA stockholders under the original merger pact would have received PAA stock of $18,845,000 book value, market value of the shares recently has been around $10 million. Thus the "new deal" would put AOA shareholders more than $7 million ahead of the old arrangement from a cash standpoint and would give them more than the market price for their shares.

This cash purchase price is fair to all parties concerned, Pan American declared in a supplemental brief filed with CAB. PAA added that it could consummate the transaction without adverse effect on its financial position.

▶**AOA a Loser**—According to Pan American, opposition arguments that the purchase price fails to assign any value to AOA's earning power should be discounted. AOA has not demonstrated any ability to show earnings apart from government aid in the form of mail pay subsidy determined by the Civil Aeronautics Board, PAA declared.

Conceding that the purchase price does not take into account AOA's profits after last June, Pan American observed that this factor is balanced by omitting consideration of AOA's possible losses during the coming winter. Besides, PAA declared, it is not CAB's duty to act as a broker to secure for the seller the highest price justifiable. "The Board's responsibility is simply to see that the price was negotiated at arms' length and within the zone of reasonableness."

▶**AA Out of PAA**—Pan American emphasized that with the AOA deal now on a cash basis, American Airlines will not become a 15 percent owner of PAA stock as in the plan which was previously proposed.

TWA had objected that the stock arrangement would so join the interests of American and Pan American that they would try in every way possible to throw business to each other.

"With a cash deal, American will have no more interest in Pan American after the merger transaction is concluded than it has now," PAA declared. "TWA will thus secure from this agreement not merely the full advantage which would normally come from removal of a powerful competitor (AOA) but the special advantage of disappearance from trans-Atlantic service of the only other domestic airline (American) engaged in such operations."

▶**No Stampede**—Backing Pan American's arguments, American Airlines (62 percent owner of AOA) declared that signing of the new cash agreement in September made irrelevant contentions that AA has been "stampeded" into the original Dec. 13, 1948, pact by rumors that TWA was about to sell its trans-Atlantic routes to Pan American. Decision of American to negotiate a new AOA sale agreement on a cash basis was made as a fresh proposition free of any obligation to continue the old contract which expired in September, AA officials declared.

American said it wanted cash for AOA all along but indicated that a year ago banks were so cool toward airline loans that Pan American couldn't raise the money required. In negotiating the new pact last summer, PAA President Juan Trippe still wanted to avoid a cash deal; but American Airlines President C. R. Smith insisted on the "new deal."

Smith said he told Trippe: "We have no obligation to extend this transaction unless we think it to be advantageous to us and unless the price is a fair one. If we don't like the proposition you put forth for the extension, we (AOA) can remain in business and, I believe, do fairly well."

▶**No "Fire Sale"**—"If we want the AOA certificate extended after 1952, we will have a fair chance (of succeeding). If the certificate isn't extended after 1952, I think the company (AOA) could be liquidated at a reasonable price, so there is no impelling reason for us to make any bad trades with you."

CAB public counsel, who ripped into the original merger proposal (AVIATION WEEK, Aug. 15), also flayed the new agreement, declaring "the further this deal goes, the worse it looks." They said that Smith's blunt statement to Trippe last summer confirmed their findings that AOA is not a weak carrier, that there is no reason for pessimism about its future, and that it is not necessary for AOA to sell out to Pan American.

▶**Trippe So Willing**—"Trippe, who was portrayed in the first hearing (last May) as not very enthusiastic about acquiring AOA, is now revealed to be willing to go to extraordinary lengths to accomplish that objective. The fact that Trippe is ready to incur a substantial additional indebtedness to acquire AOA—an indebtedness that is bound to weaken his company—demonstrates again that he is motivated not by business considerations but by a desire to expand the power and influence of Pan American."

In the first agreement, Trippe badly outtraded Smith and the whole American board of directors, public counsel asserted. "AA, in a mood of panic, not only agreed to accept PAA stock but agreed to take it six points above the market.

▶**Passing Mood**—A year later this mood had passed," public counsel continued. "American had earned $6 million on its domestic operations in the first nine months of 1949 and AOA's financial position improved. Why, then did American's directors decide to stay with the deal even on improved terms? Most likely explanation is that, convicted of bad judgment (in the first deal late in 1948), they felt they could not withdraw without losing face."

American Export Lines, founder of American Overseas and holder of 20 percent of its stock, believes that even under the new cash arrangement American Airlines is proposing to sell a going and profitable concern at a "distress price." The steamship operator accused Smith of acting "in breach of his duties and in violation of American Export's rights."

Echoing CAB public counsel, former CAB Chairman James M. Landis, representing a group of AOA employes, said the new cash agreement for selling AOA resulted because "the (C. R.) Smith of August, 1949, was not the frightened Smith of November and December, 1948, when he feared a TWA sell-out to PAA."

TWA asserted that the PAA-AOA agreement terms were modified because Pan American realized that the merger, as originally set up, would never be approved by CAB. "The change is a smokescreen to cover objections to the merger, which would place U. S. international air commerce in monopolistic hands."

Nonskeds After '50 Atlantic Traffic

Irregulars seek special exemptions to handle record boom forecast in flying student group and pilgrims.

Uncertificated carriers are making plans to tap the record passenger air traffic expected to cross the North Atlantic next year.

Barred from nonscheduled international passenger operations since September, 1947, the uncertificated lines hope the Civil Aeronautics Board will grant them special exemptions (similar to those issued last summer) authorizing carriage of students to Europe. They also want permission to fly groups of Holy Year pilgrims to Rome under contract.

Seaboard & Western Airlines has formally requested special exemptions for the 1950 flights from CAB. Transocean Air Lines and other carriers may follow suit. Certificated U. S. trans-Atlantic flag lines, which last summer opposed issuance of exemptions to the independent operators, probably will make a fight against the new applications.

CAB last June authorized S&W to make 35 roundtrips and Transocean 44 roundtrips between the U. S. and Europe, carrying student groups eastbound under contract with Youth Argosy, Inc., and displaced persons on many of the westbound flights. Other uncertificated companies, including Trans Caribbean Air Cargo Lines, Alaska Airlines, Coastal Air Lines and the Flying Tiger Line, were permitted to make passenger trips to Israel and Rome.

▶**Big Business Ahead**—Youth Argosy, Inc., a non-profit, educational group organized to further international goodwill by encouraging interchange of students, has already received over 17,000 requests for transportation to Europe next year. S&W, which flew about 2150 passengers between the U. S. and Europe under last summer's contract

with Youth Argosy, wants authority to carry a maximum of 10,000 persons each way in 1950.

Transocean and S&W this year offered Youth Argosy roundtrip U. S.-Europe transportation at between $300 and $315 per person. Regular roundtrip airline fare between New York and London is $630, although the scheduled carriers also have a 60-day roundtrip winter excursion at $466.70 and recently proposed a 15-day-limit, off-season rate of $385.

▶**Nonskeds May Up Rates**—Rates offered by the uncertificated carriers next year may run slightly higher than in 1949, but they will still be under the regular flag carriers least expensive excursions. S&W claims the scheduled operators will have all the traffic they can handle next year and will not be affected adversely by the Youth Argosy deal, especially since the students can't afford to travel by air at the higher regular rates.

The Youth Argosy program has received support from both the United Nations and Economic Cooperation Administration, according to S&W. DC-4 flights would originate in New York and go to Shannon, London, Paris, Brussels, Rotterdam, Geneva and Rome.

▶**Pilgrimage Bonanza**—Seaboard & Western also wants CAB to grant an exemption permitting the carrier to contract with Holy Year Pilgrimages, Inc., and other Catholic organizations for transportation of pilgrims between the U. S. and Italy with a minimum frequency of one roundtrip every ten days. Holy Year Pilgrimages, Inc., is a nonprofit corporation formed for the primary purpose of arranging low-cost transportation to Rome.

Over a million persons are expected to travel between North America and Rome during 1950, according to Seaboard & Western. It told CAB that steamship transportation already is booked solidly to Europe through next summer.

TWA, only U. S. flag line certificated for regular service to Rome, takes an especially dim view of Seaboard & Western's Holy Year ambitions. This month TWA urged CAB to revoke the independent operator's letter of registration as a large irregular carrier for "deliberate and flagrant violations of the law."

CAB now has before it less severe examiners' recommendations that both S&W and Transocean be ordered to cease and desist from further illegal activity, including common carriage of passengers on international flights.

Coast Tangle

Local and federal groups probe legality of coach services.

The stiff competition for an coach traffic over the busy Los Angeles-San Francisco route has wound up in a legal snarl.

Western Air Lines of California, Inc., a new corporation set up last August, is under especially severe attack for allegedly illegal activity. But other uncertificated carriers flying the link also are being investigated.

United Air Lines made the first public complaint against Western of California, charging that circumstances surrounding creation of the company indicate that it is "a mere agency or instrumentality of Western Air Lines." UAL said that Western thus may be violating the Civil Aeronautics Act by failing to seek approval of its relationship with the intrastate operator and failing to file reports, schedules and tariffs.

▶**Injunction Asked**—Soon after the United protest, three uncertificated operators which had been in the Los Angeles-San Francisco coach business before Western of California, filed a complaint in Los Angeles County Superior Court. The complainants, California Central Airlines, Arrow Airways and Robin Airways, asked for a restraining order and injunction against Western Air Lines and Western of California.

It was then learned that the Civil Aeronautics Board, which had been watching the situation closely for months, had stepped into the melee officially.

The federal agency, taking action independently, instituted four investigations to determine whether there are illegal relationships between Western Air Lines and Western Air Lines of California; between California Central Airlines and Airline Transport Carriers, Inc.; between California Arrow and Arrow Airways, Inc.; and between Robin Airways, Inc., and Robin Air lines, Inc.

Airline Transport Carriers, Arrow Airways and Robin Airlines are all large irregular carriers which have been active on the transcontinental route. CAB indicated that these companies, like Western Air Lines, may have violated the Civil Aeronautics Act by failing to file agreements made between the interstate carriers and their intrastate counterparts (if that is what they actually are), and by maintaining interlocking relationships and control arrangements without prior Board approval.

▶**Company History**—Western Air Lines of California began Los Angeles (Burbank)-San Francisco (Oakland) flights last Aug. 19 operating 73-passenger DC-4s and charging $9.95 one way, about the same fare as the complaining independent intrastate carriers. Planes and facilities of WALC are leased from WAL, which also sells tickets for the intrastate line.

WAL refuses to comment officially on its corporate relationship with WALC. But WAL has announced that the intrastate operation has been a profitable one, carrying 40,000 persons between Los Angeles and San Francisco in the past three months with a better than 80 percent average load factor during this time.

▶**Damage Alleged**—Hurt by WALC's competition, the three independent operators reportedly have filed suit for a total of $350,000 damages from Western and its alleged intrastate affiliate. The independents charge that WAL and WALC have violated California's Unfair Trade Practices Act and are engaging in a conspiracy to drive the smaller lines out of business in violation of the state's anti-trust laws.

Both United Air Lines and the independents allege, in effect, that Western of California is a paper organization set up by WAL and headed by a member of WAL's law firm.

Western of California operates three or four roundtrips daily between the Los Angeles and San Francisco areas at its $9.95 (three cents a mile) fare. Regular airline rate is $21.05.

Low Fare Encouraged At IATA Sessions

(McGraw-Hill World News)

MEXICO CITY—Two important changes in international airline rates and fares for 1950 were effected by the 15-day International Air Transport Assn traffic conference.

Special fares to promote off-season travel, including a special North Atlantic round trip rate of $385 on traffic originating in North America, to be effective between Jan. 1 and Mar. 15. This is by far the lowest fare in history on the Atlantic air crossing.

Fares on flights in Europe and the sterling area generally will also fall to a new low level as the sterling area lines persisted in their refusal to raise rates to compensate for devaluation. Final solution of this problem called for only slight increases over the devaluation rate on all flights in areas devaluating. Flights in dollar territory will be raised to compensate for devaluation when fares are sold in devalued currency.

▶"Bold Experiment"—E. C. Cocke, vice president of TWA and chairman of the conference called the new special off-season trans-Atlantic fare "a bold experiment to determine whether we can break the historical seasonal trend."

"This fare represents a determined effort on the part of the trans-Atlantic airlines to develop off-season tourist traffic to Europe," he said. "On the one hand we want to encourage the flow of hard dollars abroad. On the other hand, we think we have something unusually attractive for the wage-earner with the two weeks vacation."

The new winter trans-Atlantic rate is only one and one-tenth times the ordinary fare one way. The regular fare on the North Atlantic crossing is $350 while the special winter excursion fare will be only $385 for the round trip. This is for the New York–London flight, and will be in effect from Jan. 1 to Mar. 15. It will be good for only 15 day round trip flights, and departure from Europe must be made no later than Mar. 31. CAB announced it would approve the special excursion fare.

▶More Fares—The IATA conference also approved special off-season fares over the South Atlantic, new fares from Australia and New Zealand to Singapore and Rome, and "early bird service" from Eire to the United Kingdom. Special discounts were also voted on inclusive tours within Europe.

The battle over fares in countries where devaluation had, in effect, given them a slash of 40 percent was won by the sterling countries who stood firm in their refusal to raise fares to compensate for this devaluation. They pointed out that such increases would frustrate the aim of devaluation.

However, they agreed to slight increases to cover costs on purchases made in the dollar area, such as spare parts from U.S. manufacturers.

The agreement stated that fares for flights in dollar areas, if sold in devalued currencies, would be increased, while fares for flights in sterling areas would be allowed to stay at the new devaluation figures. U.S. airlines have to cut their fares on flights within Europe and the Middle East in terms of dollars. They will remain the same, with slight increases, in devalued currency.

CAB Reports on One Crash; Sifts Another

The Civil Aeronautics Board this month completed its report on the scheduled airlines' first fatal accident of 1949 but it was forced to keep its top investigators in the field probing the cause of the year's third major mishap—the American Airlines DC-6 crash at Dallas.

Confirming preliminary findings, CAB officially blamed the Navy pilot for the midair collision of a Grumman Hellcat fighter and an Eastern Air Lines DC-3 near Fort Dix, N. J., last July 30. The Board said the Navy pilot was guilty of reckless conduct in performing acrobatic maneuvers on a civil airway and of failing to notice the presence of the airline transport with which he collided.

All 15 occupants of the DC-3 and the F6F pilot were killed. Both aircraft were destroyed. Prior to the collision, the fighter "buzzed" a Piper Super Cruiser, coming within 100 ft. of the lightplane and sending it momentarily out of control.

▶Program Launched—CAB noted that the Civil Air Regulations, which also apply to military aircraft, forbid acrobatics on any airway at any altitude. As a result of this accident and similar mishaps, CAB, CAA, the Navy, Air Force and other agencies have launched an intensive program for apprehension of Civil Air Regulation violators, particularly those guilty of buzzing and reckless flying.

American Airlines' Dallas accident resulted in 28 deaths, bringing total scheduled air carrier fatalities this year to 89 passengers and nine crew personnel. Last year, there were 83 passenger deaths in four fatal accidents, but because of increased traffic the 1949 fatality rate per 100 million passenger-miles flown may still be under that of 1948.

The AA DC-6, bound from New York City to Mexico, crashed while landing at Love Field, Dallas. It hit buildings at the edge of the field and burst into flame. Preliminary indications were that one engine went bad during the flight and a second quit during final approach.

O'Connell Decries Agency Merger Plan

Too many doctors are taking the pulse of the air transport industry, according to Civil Aeronautics Board Chairman Joseph J. O'Connell, Jr., who has warned against new plans to merge functions of his agency into an over-all federal transportation setup.

Failure to maintain, at least temporarily, the independence of aviation agencies might have tragic consequences for the future of aviation, O'Connell declared. "The inevitable result of merging aviation into a regulatory or promotional pattern with other forms of transportation would mean that the rate of aviation development and promotion would be seriously retarded."

▶Over-Conservatism Seen—The CAB chairman said an overall transportation agency would be criticized brutally for any action it took to change the status quo.

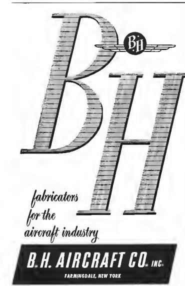
He added that government officials heading an integrated transporta

tion setup would thus be inclined to steer clear of moves (however beneficial) that threaten existing investments and markets

O'Connell emphasized that in the not too distant future air transportation must exist entirely on its own abilities without benefit of direct or indirect governmental support. "But to attempt to bring this situation about at the present time would mean a long delay in the full realization of a new resource."

▶ **Report to Truman**—The CAB chairman said he was not attempting to second-guess the Commerce Department, which is preparing a report to the President on transportation policy. The report is expected to recommend establishment of a central policy board to coordinate federal programs affecting air, rail, water and highway transport.

O'Connell conceded that it might be advisable to set up a government committee which would be a forum for the periodic interchange of views on various broad policy questions affecting more than one type of transportation. He said, however, that he did not think such a committee should attempt to be an arbiter between the various forms of transportation on questions involving major policy conflicts since that is in the province of Congress and the President.



ALSSA Pay Upped

Air Line Stewards and Stewardesses Assn. reports it has established the highest wage scales for hostesses and pursers in the industry through a new agreement with TWA covering 550 employes.

Revised wage scale for hostesses flying in the U. S. ranges from $185 monthly to start to $265 after seven years service. International hostesses will go from $200 to $295 monthly over a seven-year period, while flight pursers will earn $55 monthly to start and $355 after four years.

Average wage increase in all categories is about four percent. ALSSA is an affiliate of the Air Line Pilots Assn. (AFL).

Seek Wage Hike

The CIO Transport Workers Union has launched its 1950 contract drive by asking Pan American Airways and American Airlines for 20-cents-an-hour pay increases for 9000 ground employes.

TWU officials said present wages of the American Airlines workers average $1.72 hourly, while PAA ground employes receive about $1.65 an hour. Besides the wage hike, TWU wants new contracts starting Jan. 1 to include a reduction in the work week from 40 to 35 hr., improved pensions; three weeks vacation after five years service and four weeks after ten years, and increased pay differentials for the swing and midnight shifts.

LAA Cargo Zooms

Los Angeles Airways, the nation's first certificated helicopter mail carrier, flew sharply increased loads during its second full year of operations ending Oct. 1.

Pound miles jumped from 40,983,528 the first year to 83,840,073 in the second—a 105 percent gain. Pounds carried increased from 1,864,904 to 4,116,704—up 121 percent, and letters handled soared from 65 million to 145 million.

Operating five Sikorsky S-51 helicopters, LAA during the year ended Oct. 1, 1949, flew 5676 hr. and 355,024 mi. with an average schedule completion of 96.15 percent. Aircraft utilization averaged 101.2 hr. monthly.

SHORTLINES

▶ **Bonanza**—Hopes to start regular DC-3 feeder service between Reno, Nev., and Phoenix, Ariz., via Las Vegas and other points around Dec. 16.

▶ **Colonial**—Is considering acquisition of an all-cargo plane because of rapidly increasing freight traffic which rose 279 percent in the first nine months of this year over the same 1948 period. Company officials say rail freight rate increases helped spur air cargo volume.

▶ **Compania Cubana de Aviacion**—The Cuban company has asked CAB for a foreign air carrier permit to operate between Havana and New York via Washington.

▶ **Helicopter Air Service**—CAB has proposed a mail rate of $1.35 a plane-mile for the company's Chicago area operations between Aug. 20, 1949, and Feb. 28, 1950, and $1.15 a plane-mile for operations starting next Mar. 1.

▶ **Island Air Ferries**—The Bohemia, Long Island, N. Y., company has asked CAB for a certificate to carry passengers, property and mail between Miami and Grand Bahama Island, British West Indies, via West Palm Beach. Firm owns two DC-3s, according to Frederick H. Smith, president. A similar application has been made by Imperial Airways, Miami, which proposes using C-46s for the run. Imperial is headed by Arthur S. Clark, Jr., but Hugh Fenwick owns all of the company's stock.

▶ **Lineas Aereas Costarricenses**—The Costa Rican carrier has asked CAB for a foreign air carrier permit to operate between San Jose and Miami. Company's capital stock is owned 60 percent by citizens and government of Costa Rica and 40 percent by Pan American Airways. Costa Rican government has designated the company as the national flag carrier for operations to Miami. Use of DC-3 and C-46 equipment is contemplated.

▶ **Mid-Continent**—Reports a $44,536 net profit in October against $28,342 profit in the same month last year. Operating revenues increased five percent.

▶ **Pan American**—Travelers from Latin America flying to Europe via PAA may now stay overnight in New York as guests of the carrier before continuing their trip. . . . Company has inaugurated thrice-weekly service between New York and Nice, France. . . . PAA flew 17,000 passengers in its Stratocruisers during the planes' first six months of service ending Dec. 2. The Boeings are on Pan Am's New York-London-Frankfurt and New York-Bermuda links.

▶ **Showalter Corp.**—The Winter Park, Fla., fixed base operator has asked CAB for a certificate to conduct scheduled service from Orlando to Jacksonville, Tallahassee, Tampa and Palm Beach via intermediate points.

▶ **South Central Air Transport**—Raymond J. Ellis, president of the Fayetteville, Ark., company, has asked CAB for a certificate to operate feeder routes between Tulsa and Memphis, Joplin, Mo., and Dallas, Oklahoma City and Memphis, and Springfield, Mo., and Jackson, Miss., via intermediate points.

▶ **Trans Caribbean Air Cargo Lines**—Has been ordered by CAB to show cause why its letter of registration as a large irregular carrier shouldn't be revoked for knowing and wilful violations of the Civil Aeronautics Act. Board enforcement attorneys claim Trans Caribbean has been operating with excessive frequency and regularity from New York to Miami and Puerto Rico despite a cease and desist order issued in March, 1947.

▶ **United**—Has started a newspaper advertising campaign comparing the economy of air travel with newly-increased Eastern railroad fares. . . . UAL predicts the heaviest Christmas cargo traffic in history and will have 610,000 lb. of daily lift capacity available to handle it.

▶ **U. S. Airlines**—Eastern Air Lines has complained to CAB that the certificated all-cargo carrier is inviting a freight rate war by proposing new rates averaging 17 cents a ton-mile. EAL said U. S. had operating expenses of 62.3 cents a revenue ton-mile and revenues of only 18.4 cents in the third quarter of 1949.

CAB SCHEDULE

Dec. 12—Hearing in Western-Inland mail rate case. (Docket 2370)

Dec. 19—Hearing in Florida Airways mail rate case. (Docket 269a)

Jan. 4—Hearing on renewal of Trans-Texas Airways feeder certificate. Postponed from Dec. 6. (Docket 3720)

Jan. 4—Hearing on transcontinental coach service. Postponed from Nov. 28. (Docket 3397 et al)

Jan. 6—Hearing in New York area helicopter case. (Docket 646 et al)

Jan. 9—Hearing on air freight accumulation, assembly and distribution tariffs. (Docket 1705 et al)

Jan. 9—Hearing in Cuba-Florida foreign air carrier permit case. (Docket 3717 et al)

Jan. 17—Hearing in National Airlines route transfer case. Postponed from Jan. 4. (Docket 3500)

Jan. 24—Hearing on CAB's enforcement action against Meteor Air Transport. (Docket 4100)

Feb. 6—Hearing in Colonial Airlines mail rate case. (Docket 2720)

Feb. 16—Hearing in West Coast Airlines certificate renewal case. (Docket 3966)

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ANOTHER BUST ON US—An anonymous note from the staid headquarters of the Institute of the Aeronautical Sciences here in New York, asks "Where, Ob Where, Is that Navion?" Says our mysterious correspondent: "According to AVIATION WEEK report, Ryan Navion equipped with JATO Junior unit gets a boost of 250-lb. thrust for 12 MINUTES from the small 50-lb. installation. 'Climbs fast,' comment the blase editors."

* * *

THE FAMOUS MITTY REPORT—We have received several copies of the famous autobiographical report by the mythical character Walter Mitty, allegedly written in 1947, and still making the rounds of our more serious brethren in aviation. It as a classic of engineering gibble-gabble-gobble-degook and we enrich the literature of American aviation by quoting it here. This version comes from **Harold Hoekstra** of CAA. Here goes:

THROUGH THE SONIC WALL

We were slipping smoothly through the air at 540 mph. I'd always liked the little XP-AZ5601-NG because of her simple controls and that Prandtl-Reynolds meter tucked away in the upper right corner of the panel. I checked over the gages. Water, fuel, rpm., Carnot efficiency, groundspeed, enthalpy. All OK. Course 270°. Combustion efficiency normal at 23 percent. The good old turbojet was rumbling along as smoothly as always and Tony's teeth were barely clattering from the 17 buckets she'd thrown over Schenectady. Only a small stream of oil was leaking from the engine. This was the life.

I knew the engine in my ship was good for more speed than we'd ever tried. The weather was so fair, the sky so blue, the air so smooth, I couldn't resist letting her out a little. I inched the throttle forward a notch. The regulator only hunted a trifle and everything was steady after five minutes or so. 590 mph. I pushed the throttle again. Only two nozzles clogged up. I pushed the small-slot cleaner. Open again. 640 mpb. Smooth. The tailpipe was hardly buckled at all—there were still several square inches open on one side. My fingers were itching on the throttle and I pushed it again. She worked up to 690 mph., passing through the shaft critical without breaking a single window in the ship. It was getting warm in the cockpit so I gave the vertex refrigerator a little more air. Mach 0.9! I'd never been that fast before. I could see a little shocklet outside the port window so I adjusted the wing shape and it disappeared.

Tony was dozing now and I missed the smoke from his pipe. I couldn't resist letting the ship out another notch. In ten minutes flat we leveled off at Mach .95. Back in the combustion chambers the total pressure was falling like hell. This was the life! The Karman indicator showed red but I didn't care. Tony's candle was still burning. I knew gamma was down but I didn't give a damn.

I was dizzy with the thrill. Just a little more! I put my hand on the throttle but just at that moment Tony stretched and his knee struck my arm. The throttle jumped up a full ten degrees! Crash! The little ship shuddered from stem to stern and Tony and I were thrown into the panel by the terrific deceleration. We seemed to have struck a solid brick wall! I could see the nose of the ship was crushed. I looked at the Mach meter and froze. 1.00! My God, I thought in a flash, we're on the peak! If I don't get her slowed down before she ships over, we'll be caught in the decreasing drag! I was too late. Mach 1.01! 1.02! 1.03! 1.04! 1.05! 1.09! 1.13! 1.18! I was desperate but Tony knew what to do. In a flash he threw the engine into reverse! Hot air rushed into the tailpipe, was compressed in the turbine, debusted in the chambers, expanded out the compressor. Kerosene began flowing into the tanks. The entropy meter swung full negative. Mach 1.20! 1.19! 1.18! 1.17! We were saved. She crept back, she inched back, as Tony and I prayed the flow divider wouldn't stick. 1.10! 1.08! 1.05! crash! We had struck the other side of the wall! Trapped! Not enough negative thrust to break back through! As we cringed against the wall, the tail of the little ship crushed, Tony shouted, "Fire the JATO units!" But they were turned the wrong way! Tony thrust his arm out and swung them forward, the Mach lines streaming from his fingers. I fired them! The shock was stunning. We blacked out.

I came to as our gallant little ship, ragged from stem to stern, was just passing through Mach zero. I pulled Tony out and we slumped to the ground. The ship decelerated off to the east. A few seconds later we heard the crash as she hit the other wall.

They never found a single screw. Tony took up basket weaving and I went to MIT.

—R. H. W.

WHAT'S NEW

New Books

"Principles of Aircraft Propulsion Machinery," by Israel Katz, thoroughly covers the fundamental aspects and nature of modern aircraft powerplants, piston, turbojet, propjet, ramjet, and rocket motors. Especially interesting is the author's evaluation of existing equipment in light of historical data and developments yet under investigation. At the end of each chapter problems of a leading nature are posed to illustrate points often beyond the scope of the text. Engineering students should find these particularly advantageous, while graduate engineers would find much of the material valuable as an outline for further study. Illustrations cover the most modern types of power plants and their components. Published by Pitman Publishing Co., 2 W. 45 St., New York 19, N. Y., 477 pages, price $6.50.

"National Air Race Sketchbook 1930-1949" by Fred W. Buehl and Harry S. Gann. Foreword by Tony LeVier. Profusely illustrated history of the air races from their advent. Account of each year includes sketches of outstanding entries, and given are data tables of entrants in each event, listing place taken, pilot, plane racing and license numbers, engine and displacement, speed, and prize money won. There are three-view aspect drawings of Thompson Trophy winners. Accurate and thorough compilation of data is noteworthy. Published by Floyd Clymer, 1268 So. Alvarado St., Los Angeles 6, Calif., 84 pages, price $2.00.

"Aviation Study Manual," vol. 1, book 2, and **"Instructor's Manual,"** vol. I, book 3, are new textbooks prepared for the Civil Air Patrol cadet program, and designed for use in secondary schools. Book 2 is intended as a guide for teaching approximately 190 hr. of aviation material, which constitutes minimum requirements for the cadets. Book 3 is the manual for aiding instructors and CAP personnel in teaching the material contained in the former volume.

The comprehensive nature of these volumes and the clear-cut manner in which the lessons are scheduled make them valuable assets for any aviation study program. At present, the Government Printing Office turns out these manuals and CAP is responsible for distributing them within its organization. It is intended that extra copies will be made available through the printing office to accommodate requests from other organizations or interested individuals.

ADVERTISERS IN THIS ISSUE

AVIATION WEEK—DECEMBER 12, 1949

LETTERS

MATS Reserve

I thought you might be interested to know that the basic concept of MATS has been extended into reserve activities Under Lt Gen Harold L. George, a group of volunteers have formed the nation's first joint Air Force-Navy reserve project. The group is composed largely of air transport specialists, who with Maj Gen Lawrence Kutel's approval, have established a Western Experimental Division for MATS (At Los Angeles Airport—Ed)

All of us who are connected with the Western Experimental Division feel that the project is highly significant as the nation's first demonstration of successful Air Force-Navy unification on a reserve level by civilians Moreover, it points up a new and very practical way in which reservists in commercial aviation can utilize their cumulative experience to serve national defense

The fine, cooperative spirit shown by the Air Force and Navy reserve personnel in the new division, and the effective way in which they are working together, forecast the success of this project and add new evidence that the unification principle is sound and practical

BERT D. LYNN
1452 North Seward St.
Los Angeles 28, Calif.

Early Coach Support

We read your splendid editorial, 'The Trend to Mass Air Travel," and your very objective report of Capital's experience with the air coach

Needless to say, we are most appreciative of AVIATION WEEK's support, which began when there was a very large question mark hanging over the air coach concept

HAYES DEVEN
Secretary and Director of Public Relations
Capital Airlines
Washington, D C

Beech Dividends

I have just read an article by Selig Altschul in AVIATION WEEK, Nov 14, concerning dividends of aircraft companies Mr Altschul states that Beech, Cessna, North American, Fairchild, and Ryan have paid "token dividends" during 1949

During our fiscal year of 1949, Beech paid four dividends of 25 cents per share, making a total of $1 per share distributed for the year This is equal to the highest dividend rate that has ever been paid on Beech stock, and was paid on the increased volume of stock of 600,000 shares as compared with the original volume of stock of 400,000 shares which existed during the entire war period and for a couple of years thereafter until the 50 percent stock dividend was issued

Six hundred thousand dollars distributed to stockholders may be a "token" to Mr Altschul, but our idea of a token is very substantially different from his, because we think that $600,000 is difficult enough to earn to remove it from the 'token" class.

JOHN P. GATY
Vice President and General Manager
Beech Aircraft Corp
Wichita, Kans.

Praises CAA

Your Oct 17 issue with the comment regarding the CAA certification argument which was set off by Dr Bollinger and the Helioplane project causes us to wonder just what goes We have been working closely with CAA during the development of the Aerocar and we can assure you that we have not had the slightest difficulty to any regard on the certification requirements of CAA. We have found that instead of being a hindrance, as some people have claimed, CAA has been more than cooperative, and have done everything they could to assist us If there was anything further they could do to be of assistance, I am sure they would do it

As for the arguments against the certification, all we can say is that we are of the opinion that we would want to do everything CAA requires for our own information even if CAA didn't exist. The requirements of 04 are intended as a guide and a minimum requirement as far as we are concerned, and I am sure that without them it would be very easy to go off the deep end and get into trouble. Now maybe this isn't the situation in all CAA regions, but the 7th Region personnel and directors are certainly bending over backward to help us get the Aerocar into production, and the Washington office has made many special considerations which the unique nature of our machine has made necessary We are pleased with their answers, and in every case where there has been any question, they have given our ideas every consideration

Of course, we are comparatively inexperienced in aircraft production, and the benefit of manufacturing inspection by the same inspector who inspects the Boeing Stratocruiser has proved a great aid to us, you can be sure. His suggestions and recommendations only serve to make the Aerocar the sort of a product we want to produce As far as cost is concerned, I would estimate that the requirements of CAA have not added $1000 to our cost in building the Aerocar, certainly not an excessive cost when you consider the satisfaction of having their experienced approval of our efforts

We have approached the aircraft problem with no pre-conceived ideas, and we are finding that the 'flying automobile" is opening an entirely new field of aviation Even CAA is considering the Aerocar as different from conventional aircraft as the helicopter Perhaps the difficulty with the Helioplane and some of the other more conventional planes is their conventionality

Anyway, we can't see the point of people like Mr Loening and Dr Bollinger on this CAA-development question and as soon as we fly the Aerocar and demonstrate that a little company can produce a new development even with CAA's aid, I am sure the critics are going to have to find something new to blame for their problems

MOULTON B. TAYLOR, President
Aerocar
Longview, Wash.

Airport Service

I would like to make the point in connection with airline charters and airline special flights that when airlines make trips away from their regular scheduled routes and airports, they invariably expect service from other airlines, which means that the airport service operators or fixed base operators do not always get the business of gassing and servicing these chartered planes Here again the airlines are competing with non-scheduled aviation, and frankly, we don't like it

My interest in this matter is as a fixed base operator offering airport services at four airports and not as that of a charter operator of large planes

BEVERLY HOWARD, President
Hawthorne Flying Service
Charleston, S C.

No Guns

In your column, Industry Observer, AVIATION WEEK, Sept 12, 1949, your observer has been misinformed The Spitfire which competed in the Tinnerman Trophy Race was not, repeat, not 'one fully equipped military aircraft"

I, personally, saw the guns removed here at Edmonton and armament consisted of two (2) 50 calibre machine guns, I agree the configuration was not changed but certainly the 'fully-equipped military aircraft" description is not based on fact

I would like to see a correction on this I have a color photograph to prove my point

MAJOR MIKE M KOVACEVICH, USAF
P O Box 426
Edmonton, Alberta, Canada

(Maj Kovacevich is correct The Spitfire carried no guns, as was apparent to AVIATION WEEK staff members at Cleveland who examined the plane and interviewed its pilot, J G McArthur The writer of the Industry Observer note considered it obvious however that the armament of any combat plane must be removed before sale to a civilian pilot and believed his reference to 'factory-delivered' indicated an absence of armament —Ed)

(Kenneth Fletcher of TWA, whose letter appeared in AVIATION WEEK Nov 21, is the carrier's Manager, Public Relations, at San Francisco He was incorrectly identified as TWA's Director of Public Relations—Ed)

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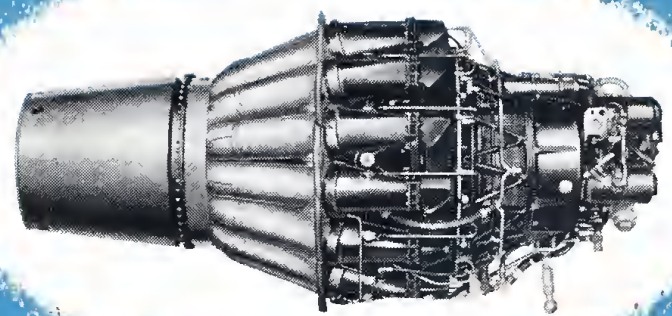

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Northrop RB-35B Flying Wing
Martin P4M-1 Mercator
North American AJ-1